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# THE IRON AGE

## Contents

JUNE 24, 1937

Getting Back to Normal .....	29
Morgan Supplants Garrett at Joliet .....	30
Plastic Molding Requires Sound Engineering Practice ....	36
Gray Cast Iron .....	40
Industrial Railways Provide Unusual Services .....	44
Welded Steel in Railroad Service .....	50
New Equipment .....	52
Automotive Industry .....	56
Statistics on Metal-Working Activity .....	62
Rate of Activity in Capital Goods .....	63
Washington News .....	64
NEWS CONTENTS .....	78
Plant Expansion and Equipment Buying .....	122
▼ ▼ ▼	
New Industrial Literature .....	127
Just Between Us Two .....	140
Products Advertised .....	140
Index to Advertisers .....	166

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# ▲▲▲ THE IRON AGE ▲▲▲

JUNE 24, 1937

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## Getting Back to Normal

A COMPETENT and well informed Englishman has been visiting the United States. He has quite naturally and in fact unavoidably been impressed by the volume and the violence of the labor troubles that we are experiencing.

Labor trouble is not unknown in England. In fact that country has had its share of such disturbances. Unionization is further advanced in the "tight little Isle" than it is here, and England has even experienced a Labor Government. So the visitor was not impressed as much with our epidemic of strikes as might have been expected.

He was, however, greatly impressed by one thing that is accompanying our strikes in America and which has not been allowed to accompany them in England. "And this," he said, "promises serious consequences for your country. In England, every one respects the courts. No group has ever been permitted to flout them. We Englishmen believe our courts to be the bulwarks of our freedom. Our nation would rise in wrath against any attempt to replace court authority by mob rule. And that is what your federal, state and local governments are permitting if not encouraging."

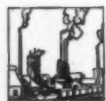
Unfortunately, what he says is true and so obvious as to be undeniable. And the example was set in this matter for our state and local political authorities by the President of the United States in his unprecedented attempt to make a rubber stamp of the Supreme Court of our country.

But fortunately the courageous members of the Senate Judiciary Committee have effectively closed the door to the possibility of success of this proposal. In the most scathing indictment of an administrative act that any President has yet received from members of his own party, this report sounds the death knell of Constitutional nullification.

This report of the Senate Judiciary Committee upon the President's court packing bill should be read from beginning to end by every liberty loving American. It is our second Declaration of Independence.

The fact that Democratic Senators were courageous enough to write the ringing words of this indictment is proof that our country is getting back to normal.

*J. H. Van Derveer*



PERHAPS George Bedson, of Manchester, England, was an amateur historian as well as an adept engineer. Or, perhaps, he only hazily recalled his youthful studies on Cortez' conquest of Mexico, and how that impetuous Spaniard expedited victory by burning his ships and making retreat impossible. Or, perhaps, he was ignorant of the whole affair. In any case, Bedson consciously or unconsciously subscribed to the same policy of forceful action to liquidate a crisis.

As superintendent of Richard Johnson & Nephew Wire Works, Mr. Bedson had devoted years of repeated experiment and persistent endeavor to set up stands of rolls in a straight line, with speeds and reductions so adjusted that an iron billet could be fed in one end and be continuously reduced to a wire rod.<sup>1</sup> Overcoming almost insurmountable difficulties, Mr. Bedson in 1867, succeeded one morning in getting his 17-stand group of rolls regularly turning out iron rods. Returning in the afternoon, he found the workmen had closed down the continuous installation and were making rod as usual in the old-style hand mill. Thereupon, Mr. Bedson whistled for the crane, had the housings of the old mill carried to the drop and broken into

<sup>1</sup> Wire rod is circular in cross-section and generally as long as commercial operation permits. It is the finished product of the hot rolling mill, but constitutes the raw material used in the wire mill; for it's the first step in the making of wire. Wire rod varies from 0.734 in. in diameter down to 0.207 in. (No. 5). Anything larger is classified as bars, anything smaller as a wire. A 16-point tolerance is commercially acceptable today, and most rod mills prefer to work on the heavy side, selling No. 5 rod with a diameter near 0.218 in. Rod can be rolled down to No. 8, or 0.162 in., but the trade considers it more economical to draw No. 5 rod down to this size rather than attempt to accurately roll such a small diameter.

<sup>2</sup> Cobble, in rolling mill parlance, means that a rod fails to hit a roll aperture. In a continuous unit, with speeds of 1000 ft. per min. (today, about 3500 ft. per min.), failure to enter the next roll means that the workmen dive for the exits and the rod takes possession of the building, generally ending up in a knot around the rafters.

<sup>3</sup> The Belgian looping system developed during the same period as the continuous system, both of which killed off the single-stand hand mill. Users of Belgian mills either could not get or did not want a continuous mill, although Belgian rod failed to match continuous mill rod. The Belgian set-up consisted of a number of roll stands side by side, all running at the same speed. The rod was reduced in one set of rolls, then hand looped around for further reduction in the next set. Finishing speeds were no faster than roughing speeds, and rods were necessarily short and badly oxidized.

scrap. The workmen suddenly developed extraordinary enthusiasm for the continuous mill, and shortly thereafter the company proudly exhibited a continuous iron rod 0.244 in. in diameter (No. 3) and 1600 ft. long at the Paris Exhibition, to the open-mouthed awe of contemporary producers.

Such was the birth of continuous rolling. Bedson's continuous

iron (which tended to pull apart in the continuous unit) during this time had not been rapidly subverted by cheap bessemer and open-hearth steel which quickly demonstrated adequate homogeneity and tensile strength in the heated condition to permit commercial production in a continuous unit without constant danger of cobbles<sup>2</sup> and serious breakdowns.

# MORGAN SUPPLANTS

*By* T.W. LIPPERT

rod mill, the prototype of the sleek modern continuous sheet-strip mill, despite its supremacy over the single-stand hand mill had a hazardous history. For a decade the superior and longer rod it produced in England recognized no equal, and there was immediate need for such a machine in this country. For the few hand mills in the United States proved totally inadequate to cope with the demands for longer and stronger wire to string up Samuel Morse's telegraph along the railroads springing up over night all over the country. At the same time the wire nail was a ridiculed idea and barbed wire to fence the West, an inventor's dream, both held in abeyance until better and cheaper wire became available.

Fortunately for this country (and also for the idea of continuous rolling) Bedson's good friend, Ichabod Washburn, of Washburn & Moen Mfg. Co., Worcester, Mass., had sufficient foresight and courage to personally contract for a continuous mill, which was successfully placed in operation in 1869. But still the process would probably have languished if Washburn had not had a clever superintendent, Charles H. Morgan, and if

The different quality of metal available and Morgan's ingenuity in developing a power reel, re-vamping the roll arrangement and developing finer coordination of draft, roll diameters and roll speeds, resulted in a comparatively modern unit in 1880, which consistently turned out No. 5 rod, in lengths of 1000 ft. or more and at speeds of nearly 1500 ft. per min. Nonetheless, the continuous mill was still an expensive and temperamental piece of equipment, requiring constant care and highly skilled operators.

At this stage of the game, still another mill superintendent, Mr. William Garrett, of Cleveland Rolling Mill Co., revamped the old-type Belgian looping mill<sup>3</sup>, made it partially automatic (see page 35), and approximated many of the advantages of the continuous system by keeping the front end of the billet constantly moving forward at an increasingly rapid speed. Garrett's setup required little highly skilled labor, production was higher, it was more fool-proof and flexible, and, withal, just as accurate. Licenses were easy to obtain, and the industry flocked to this process.

By 1892 Garrett had built and

was operating a mill at the Joliet Steel Co., Joliet, Ill., and it was during this period and up through the turn of the century that he tasted real success. His consistent production of No. 5 rod at the rate of 14 tons per hr. in bundles of 150 lb. (1300 ft.) was the admiration of the rolling fraternity, although it must be admitted that by modern standards his diameter

of special sections in small lots. Joliet's Garrett mills went to the scrap pile in 1931, and for six years no rods have been rolled at the scene of Garrett's triumph. But this week, Joliet dedicates a new plant, which contains two of Morgan's most modern continuous rod rolling units and numerous special devices designed by engineers of the American Steel &

with this tremendous speed, the company fully expects a diameter accuracy for No. 5 rod to within plus or minus 0.005 in., a tolerance which is most conspicuous in view of the plus or minus variation of 0.016 in. commercially acceptable today.

The great accuracy, the speed and the low power consumption (one 4500 hp. motor runs each unit, which represents a saving of about 1000 hp.) spring directly from the overall application of tapered roller bearings. The first five roughing stands have four-row bearings of 9-in. straight bore, 13½-in. outside diameter; bearings on the four intermediate stands are four-row assemblies having an 8-in. straight bore with a 12-in. diameter; and the last ten finishing stands have two-row bearings with a tapered bore measuring 6 x 10 in. All the roll neck bearings are grease lubricated. The close adjustment necessary to roll precision rods of this type is simplified by specially designed bearing adjustments which permit close control over roll movement in either vertical, horizontal or longitudinal directions. Any roll weave has been effectively removed, and no longer is it necessary to adjust passes with a sledge hammer. Notice the small levers beside the roll housings in pictures (2) and (3) on the following page. A 30-deg. movement of any lever gives a roll adjustment of 0.001 in., and smaller movements result in correspondingly smaller adjustments.

Power saving, extreme quietness in operation and precision in adjustment and maintenance also result from the use of universal spindles throughout, rather than the usual wabblers. All the pinions of the roughing mill have herringbone teeth. Pinions in the finishing mill, together with their speed-up gears, which are arranged in the same case, have single helical teeth. The bevel gear drives are spiral and the gear reduction sets are herringbone. All this precision power transmission has reduced mill vibration to a minimum.

Details of the rolls are as follows:

The five roughing mill rolls have 24-in. barrels, are 15 in. in diameter, and are provided with six passes across the roll face. The passes in the first two roughing mills are ovals, the third is square, the fourth oval, and the fifth

# GARRETT AT JOLIET.

*Metallurgical Editor*

tolerances were most liberal—Mr. Garrett guaranteed nothing better than No. 5 in one direction and No. 7 in the other.

During this time continuous rolling dropped to its nadir, and pessimism became so rife that one of Morgan's engineers, Mr. Daniels, publicly advised at least one company to purchase a Garrett mill rather than a continuous unit. Nonetheless, Morgan persisted. Roll speeds were increased, more efficient twist guides were devised, controls simplified, more dependable relations between reduction and rolling speeds developed, and a thousand and one other problems solved. Slowly, favor again swung to the continuous method, this time permanently, and prior to the World War Morgan's method was dominant. Although Garrett did not live to witness the reversed trend, Charles Morgan did.

A number of Garrett mills still are turning out rods, many being retained because of their flexibility, which permits of rapid production

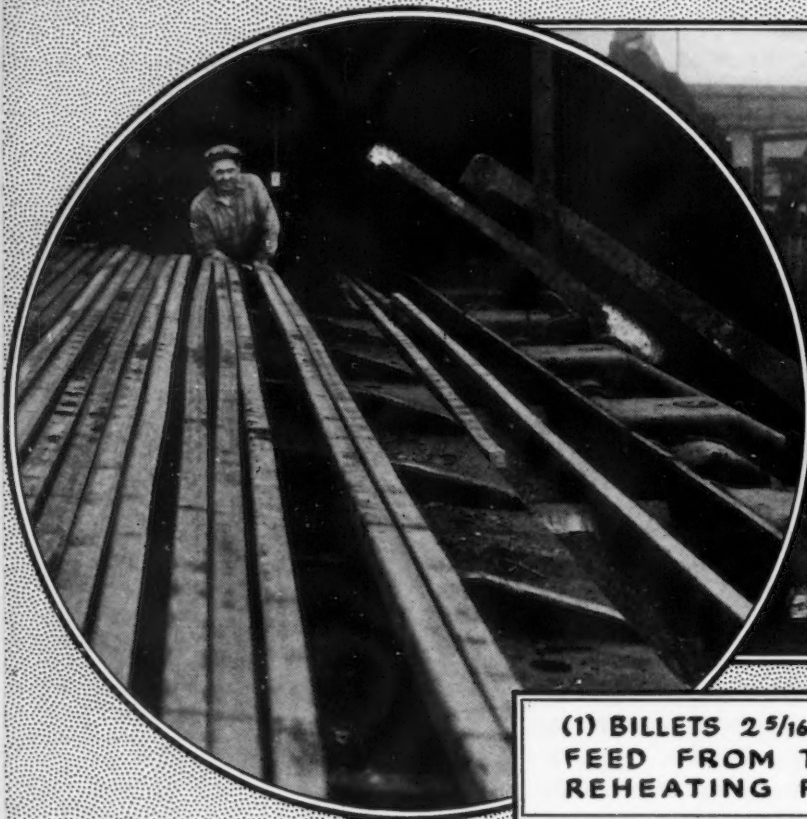
Wire Co. The entire plant has been devised so as to turn out a standard No. 5 rod with maximum efficiency, and American Steel & Wire Co. claims a record for speed, length of rod, accuracy to gage, and efficiency in the handling and inspection of bundles.

The new mill contains two identical 19-stand continuous rod mills, paralleling each other. One will turn out No. 5 rod at all times and the other will take care of gages from No. 5 up to 0.5 in. in diameter. This construction is part of a \$5,000,000 development by American Steel & Wire Co., which includes improvements in the South Chicago and Gary billet mills, as well as the wire mills in Illinois. None of the rod made at Joliet is for sale; all of the 220,000\* tons produced annually is scheduled as process material to supply the wire mills of American Steel & Wire Co. at De Kalb, Ill., and the Rockdale and Scotts Street works in Joliet.

Each mill finishes two rods simultaneously, and delivery speed exceeds 3400 ft. per min., or 40 miles per hr. Thus, it is possible to have a 600-lb. bundle of No. 5 rod (5200 ft. long), delivered to the reels once every 18 seconds. Even

\* Wire rod should not be considered a specialty item produced only in small quantities. The total production of all makers is quite sizable, amounting to well over 2,000,000 tons last year, which is considerably in excess of the tonnage of heavy and light structural shapes produced during the same period.

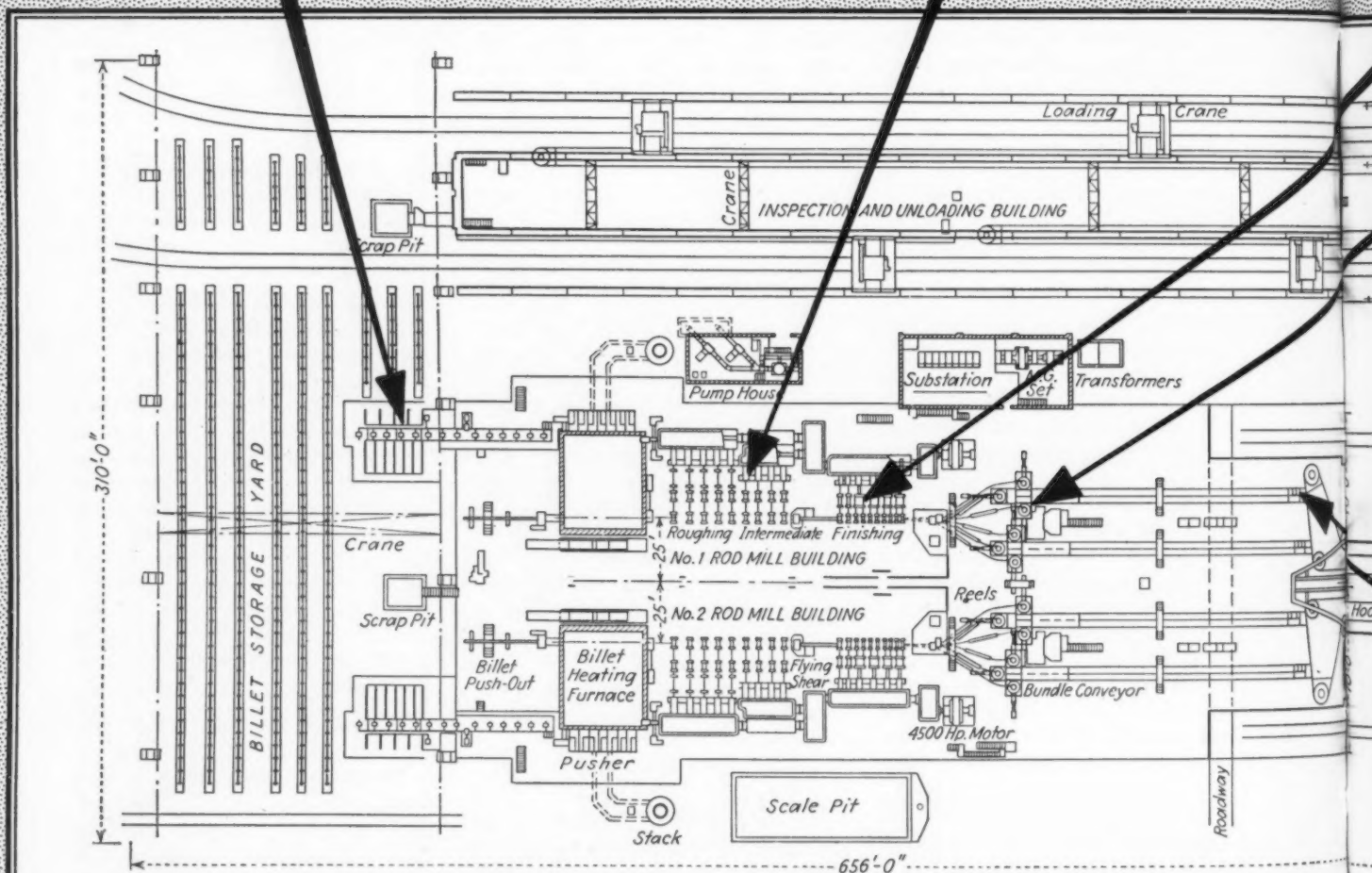




(1) BILLETS  $2\frac{5}{16}$ -IN. SQUARE  
FEED FROM TABLE INTO  
REHEATING FURNACE.



(2) BILLETS AT  
2000 DEG. F. FIRST  
REDUCED IN  
ROUGHING STANDS.



AMERICAN STEEL & WIRE CO.'S NEW ROD MILLS, JOLIET, ILLINOIS  
CAPACITY, 220,000 TONS YEARLY.

S AT  
F. FIRST  
ED IN  
STANDS.

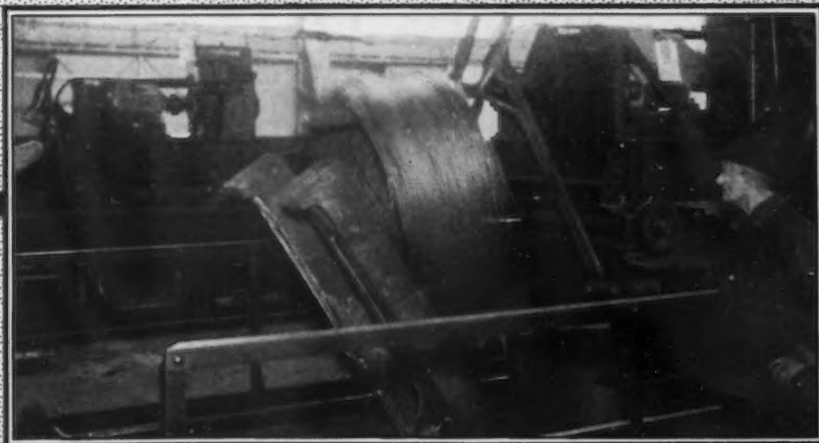
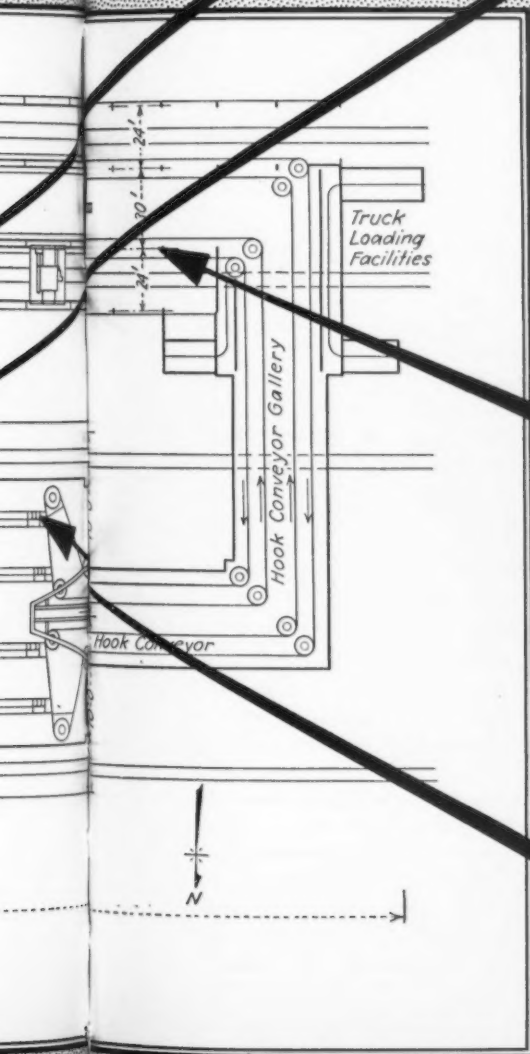
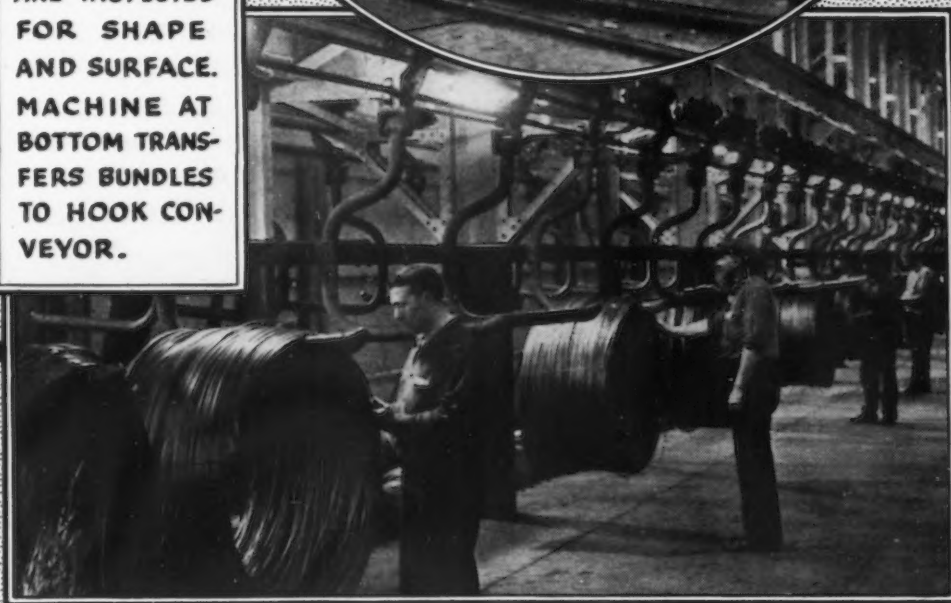


(3) HIGH-SPEED  
TWO-STRAND  
FINISHING  
STANDS WITH  
COBBLE  
SCREEN ABOVE.

(4) BUNDLE  
OF RODS  
BEING PUSHED  
FROM THE REEL  
ON TO THE  
BELT CONVEYOR.



(5) COILS OF RODS  
ARE INSPECTED  
FOR SHAPE  
AND SURFACE.  
MACHINE AT  
BOTTOM TRANS-  
FERS BUNDLES  
TO HOOK CON-  
VEYOR.





square. Since there are six duplicate passes in each roll, and, since two billets are roughed simultaneously, the strands may be shifted three times before all passes are worn. The roughing rolls will probably require changing once a month. To change rolls (either roughing or finishing), the housing, together with the rolls, will be removed, and another assembly, previously adjusted, will be set in place, the entire operation requiring not over 30 min.

The four intermediate stands of rolls measure 13 in. in diameter and have a 24-in. barrel. Since the speed at this point is considerably greater than in the roughing group, the wear in the passes is more pronounced. The smaller size of the rod permits the machining of 12 passes across each roll face. As the passes wear and get inaccurate, the rod strand is shifted, usually twice in the intermediate group for every shift in the roughing group. Intermediate rolls will also last about a month before they need be removed for machining.

The ten finishing stands measure 11 in. in diameter and have 16-in. barrels. The first six sets have 14 passes across the face and the last four have 28 duplicate passes. As in all the preceding roll groups (except the first two) reduction alternates from square to oval throughout the finishing group, although the last stand naturally has a round pass.

Rolling speeds vary from 8.38 r.p.m. in the first roughing stand progressively higher to 1126.45 r.p.m. in the final finishing stand. A single billet will pass through the entire group in 70 sec. Maximum reduction in area in any pass is 35 per cent and minimum reduction is 9 per cent (in the last pass). Except for one twist in the roughing mill, the rod on leaving a square pass is not twisted throughout its travel. On leaving an oval pass, however, the rod is always twisted 90 deg. before entering the following square pass. The guides to edge the ovals (between alternate stands) may be shifted parallel with the roll face as the strand is shifted from one pass to another, as each pass becomes worn.

The use of alternate squares and ovals is typical of both rod and bar mills of all types, and has been recognized as an efficient reduction

cycle for at least 100 years. Practically a maximum flow of metal is obtained without danger of splitting, and the square and oval passes may be machined with ease and accuracy. Other types of passes may theoretically give better metal flow, but machining and operating difficulties long ago sent them to the discard.

Between the intermediate group of rolls and the finishing group, a flying shear is placed to crop off burred ends which might give rise to cobbles in the high-speed finishing roll train. The flying shear is somewhat different from usual types, having a particularly smooth, quick ( $\frac{1}{2}$ -sec. cycle) and controllable action. It was designed several years ago by George Rose, chief engineer of American Steel & Wire Co.

The billets as received at Joliet measure 2  $\frac{5}{16}$  in. square, are about 30 ft. long, and weigh in the neighborhood of 520 lb. The billets are placed onto a skid platform and rolled onto the furnace approach tables, one by one, as shown in picture (1) on the following page. After each is pushed into the furnace, long arms come in from the side of the furnace and push the whole row of billets towards the hot end of the furnace. In this way a gradual feed of billets from the cold and towards the discharge end is maintained. Full automatic temperature control is secured by means of pyrometers hung from the roof of the furnace and connected to temperature recording instruments and the fuel control apparatus. Each of the reheating furnaces has a hearth approximately 32 ft. long and 34 ft. wide, and is heated by coke oven gas from the Carnegie-Illinois coke plant. At the discharge end of the furnace the billets reach a temperature of 2000 to 2100 deg. F., and are mechanically pushed from the furnace directly into the first roll of the continuous mill.

In the old Belgian or Garrett mills, temperature drop during rolling was the direct cause of most of the operator's headaches. The billets had to be heated excessively, which resulted in severe scaling, but none the less the front end of the rod generally finished hot and the last end finished cold, the result being a tapered end; diameter inaccuracies were common throughout the entire length of the rod because of the changing

malleability of the steel and the tendency to overfill (fin) or underfill the passes. In this new Joliet unit, however, the passage through the roll train is very rapid and temperature drop is almost negligible—not more than about 350 F. deg., from about 2100 F. deg. down to about 1750 or 1800 deg. The obvious results of this quick passage are less scrap loss and uniform malleability of the steel, the latter resulting in a minimum of roll adjustment to keep diameter tolerances within plus or minus 0.005 in.

As the rods leave the final finishing pass at a speed of 3400 ft. per min., they pass through water-cooled guide pipes and a scaling device, thence to coiling reels set below the floor level. These reels are of the conventional pouring type, i.e., the rod is directed into a receptacle revolving at a synchronized speed. Examination of the drawing on the preceding page will show that each mill is supplied with six reels. A semi-automatic switching device can throw the rods from one reel to another with only a few inches to spare between the ends of the rods, and this arrangement permits coiling as fast as the mills can turn out the rod.

When one entire length of rod (5000 to 5200 ft.) has been coiled in one reel, a hydraulic spider disengages the coil and lifts it up flush with the floor level. On the preceding page, photo (4) shows a coil in this position. The sketch on the same page indicates that the reels are arranged in groups of three so that bundles of rods (after rising to floor level) may be pushed onto a central drag conveyor. After moving slowly forward for about 12 min. on this conveyor, the bundles reach a transfer machine. Each of the four drag conveyors is for part of its length surrounded by a muffle, on top of which is kept a pool of water. This arrangement permits of a partial control over cooling speed.

To transfer the bundles from the drag conveyor to an overhead hook conveyor, the engineers of American Steel & Wire Co. have devised a unique machine, a view of which is shown on the preceding page. Normally, bundles are merely flopped over onto a hook conveyor, which system results in some abuse of the bundle and also places the rear end of the rod (which requires the more detailed inspection) in the back where access to it is difficult. The transfer machines used at



Joliet (four of them—one for each drag conveyor) handles the bundles in an entirely different manner. Note in photo how the machine straddles the drag conveyor. As each bundle nears the end of the conveyor, a section swings it up at a 45-deg. angle. The machine moves forward, the ram or nose of the machine drops to 45 deg., engages the bundle and lifts it to a horizontal position. The hinged section

### MR. WILLIAM GARRETT,

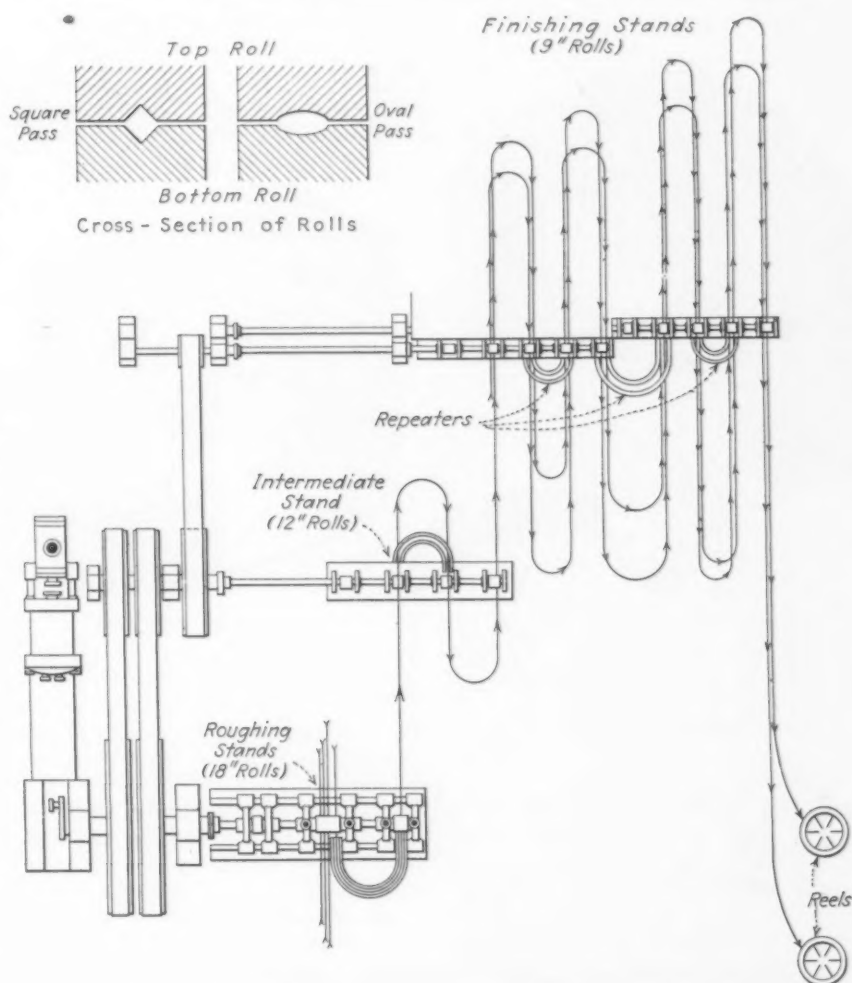
superintendent of the Cleveland Rolling Mill Co. in 1880, was at the same time a clever engineer and a canny Scot, which probably accounts for his exasperation every time he passed the clattering Belgian looping mill slowly grinding out 300-ft. lengths of wire rods at less than 1 ton per hr., withal more often than not oval in cross-section rather than round and at all times coated with a generous layer of scale most difficult to remove prior to drawing into wire. Mr. Garrett recognized a need for greater speed, longer rods and closer tolerances. Thereupon he journeyed to Worcester, Mass., to see what luck those old masters of rod rolling, Ichabod Washburn and Charles Morgan of Washburn & Moen Mfg. Co., were having with their revamped Bedson continuous mill. Their rods were half again as long and the hourly output of 5 tons most spectacular; but the tandem setup was temperamental to the extreme, expensive to build and maintain, bad scaling still was a problem and diameter tolerances were unimpressive. Anyhow, Washburn and Morgan were reluctant to license competitors.

Later, Mr. Garrett was in Columbus to check on rumors of automatic return of loops on a Belgian mill by means of repeaters devised by a Mr. McCallip. Then the idea was conceived to speed up the Belgian process by breaking down the mill into three independent sections, each driven at a progressively increasing rate, so as to rough at low speeds and finish at rates up to 1200 ft. per min., thereby keeping the loops from lying all over the floor for long time intervals. The system became 50 per cent automatic by using McCallip's repeater, hourly outputs went up to 10, then to 20 or more tons, lengths increased to over 1000 ft., the process became comparatively fool-proof, flexible, accurate and low in cost. Garrett mills far overshadowed all other processes for several decades after 1885, and a number of mills still are turning out rods. A much improved Morgan continuous mill, however, has since before the War outclassed Garrett's mill in many ways.

The stands of the original Belgian mill were side by side, all driven at the same speed from the same shaft. Garrett's mill, sketched above, was essentially Belgian, although it was broken into three independent roll groups arranged in echelon. Billets first were reduced, square then oval, by hand passing back and forth in one roughing stand, until they were long and flexible enough to loop in the Belgian manner. The intermediate and finishing stands then took up the reduction at an increasingly rapid speed, frequently handling two bars at one time, as above.

Instead of having a man at each roll to catch the rod, twist and feed it into the next pass, repeaters (horizontal, trough-shaped, semi-circular, open-top guides) are used. That is, the rod, as it issues from one roll stand, runs around this trough and into the following pass. Roll speeds are not adjusted to take up all the increased length due to reduction; consequently the loops grow longer, and in so doing free themselves by rising bodily out of the repeater and spreading out over a sloping floor. Note, however, that a repeater is only fool-proof on the square side of the mill, in taking this bar, twisting it 45 deg. and returning it to the next oval pass in the neighboring stand. It's not dependable in twisting an oval 90 deg. and returning it to the next square pass.

Because repeaters failed to edge ovals properly, catchers were most always retained on the oval side. It took a nimble and strong man to nab and twist these rods without getting lassoed, particularly on the last stand where speeds exceeded 1000 ft. per min. Early in the game, some forgotten Irishman named Mickey was notorious for his able handling of this last oval. Mickey's name has been slurred to mucky, and to this day Garrett mill men refer to the last oval return as the mucky pass.



of the drag conveyor drops back to a horizontal position to take on another bundle, and during this time interval the transfer machine moves forward and places its bundle onto the hook conveyor. Throughout this procedure, the rod encounters no abuse, and, when the transfer is completed, the rear end is on the outside, as in photo (5), where it is readily accessible to inspectors.

The speed of the hook conveyor varies from 9 to 27 ft. per min., and as the bundles are slowly carried around the building (see sketch) they drop sufficiently in temperature in 40 to 60 min. to permit handling by inspectors. The inspectors watch for slivers, cracks or pipe in the rods (which can be traced back to the ingot), and keep their eyes and micrometers busy for immediate detection of rolling defects, such as flat, finned or lapped rods due to improper setting of rolls, bad ends due to lash of the rod end as it passes through the rolls or because of insufficient cropping, and rough surface, arising from excessive wear of grooves.

# Plastic Molding Requires



SO much has been said about the ease with which molded plastic parts are produced, the misconceived notion often prevails that little planning or engineering skill is required in this constantly growing industry. Contrarily, the opposite is true.

A day spent in the plant of any leading molder will disclose innumerable examples of planned production molding where finished parts must meet exacting requirements; where molding temperatures and pressures must be maintained to definite specifications; and where molding operations must be carried out with extreme accuracy so that the parts produced will be within tolerances as close as plus or minus 0.005 in.

Take, for instance, the plant of the Chicago Molded Products Corp. where production of molded products is not only well planned, but is accomplished at as high a rate as is consistent with good quality. This plant is equipped with 56 molding presses which vary in size from small hand presses for moderate to low production requirements up to 500-ton presses for either large multiple-cavity molds or single-cavity molds for unusually large molded parts.

Production includes not only con-

ventional compression molding, but also injection or extrusion molding which is gaining importance. It also includes the building and servicing of molds in a well equipped tool room. Even before production molds are made, the design of molded parts is checked by the plant's engineering department. Often models of parts and sample molds are made before any work is started on production molds. This practice eliminates many costly errors which are difficult to rectify once production molds have been made. This department works in close cooperation with the customer and frequently recommends changes in design which will minimize mold and production costs, and still give the desired results.

Bakelite molding materials are stored in racks in covered containers or kept in the original drums until required. A separate storage room, away from the dust, is used to store colored molding materials so that they will not become contaminated.

## Material Mostly Preformed

About 80 per cent of the molding material employed is preformed. Each preforming machine is in a room by itself to confine the dust incident to its use to the immediate location of the machine. Preforming machines employed for colored

molding materials are carefully cleaned whenever the color is changed.

Materials that are not preformed are usually weighed into cups and delivered in covered tote boxes to the molding presses. On some jobs, where the molding cycle is comparatively long, the press operator measures or weighs the material at the press. Loading frames are employed for quantity production of small pieces and these are filled by the operator during the molding cycle of the preceding charge.

Beside or behind each operator is a bench where the charge is prepared and where molded pieces are usually placed until cool, unless it is necessary to cool pieces in the mold. Here, also, the operator gives the molded pieces a preliminary inspection to see that they are free from defects. Flat pieces and others which may have a tendency to warp and which do not require cooling in the mold are sometimes placed under pressure in special cooling fixtures; or they are carefully placed in covered tote boxes for slow cooling.

## Automatic Molding Predominates

Most high-production molds are automatic and kept in the press. Light-weight hand molds are used for many small or medium sized parts, especially when the production run is short, when the molding cycle is comparatively long, where considerable time is required to place metal inserts in the mold, or where split mold parts are required. Sometimes, handling of the mold is facilitated by attaching to the lower platen of the press a steel shelf made from wide channel iron. The top of this shelf is level with the platen. Since the shelf moves with the platen, it is easy to handle the mold and to slide it from the press. To speed up opening molds and for ejecting parts, hand arbor presses are em-

# Sound Engineering Practice . . .

played. When there are several small parts ejected at once, they drop into a tray ready for quick transfer into tote boxes to the finishing department.

When light colored molding materials are used, presses are well screened and tote boxes are kept covered to exclude dust from adjacent presses. Operators wear clean white gloves which not only protect the hands, but quickly indicate the presence of dirt.

Each press is equipped with a time clock which the press operator sets every time his press closes on a new charge. This insures uniformity in the molded parts. When unusually close limits are required, the operator may use checking gages. Generally, inspectors watch the molded parts coming from several presses and check them frequently to minimize rejects and to make sure that the parts meet customer requirements.

## Method Used for Clock Part

Fairly typical of medium size molding produced in this plant is the housing for one model of the Western Clock Co. This part is produced in a two-cavity mold at the rate of about 30 pieces an hour. Four inserts, one near each corner, and four preforms, one placed adjacent to each insert, comprise the charge. When removed from the mold, each piece is cooled under a  $\frac{1}{2}$ -in. plate of steel to prevent warpage.

At another press bumper blocks for automobile door dovetails are being molded at the rate of 1000 per hr. These blocks measure  $1\frac{1}{2}$  x  $\frac{5}{8}$  x  $\frac{3}{4}$  in. Each has two cored holes for springs to hold it in contact with the metal dovetail. In service, the blocks must resist shock and frictional action, and should not squeak when in contact with the door-frame. For this reason, a graphite-filled type of Bake-

lite molding material is used to form the surface of the block. To insure adequate strength, however, the body of the block is made from a preform of special impact-resistant molding material. This preform keeps the impact-resistant material separate from the self-lubricating material until they fuse in the molding operation.

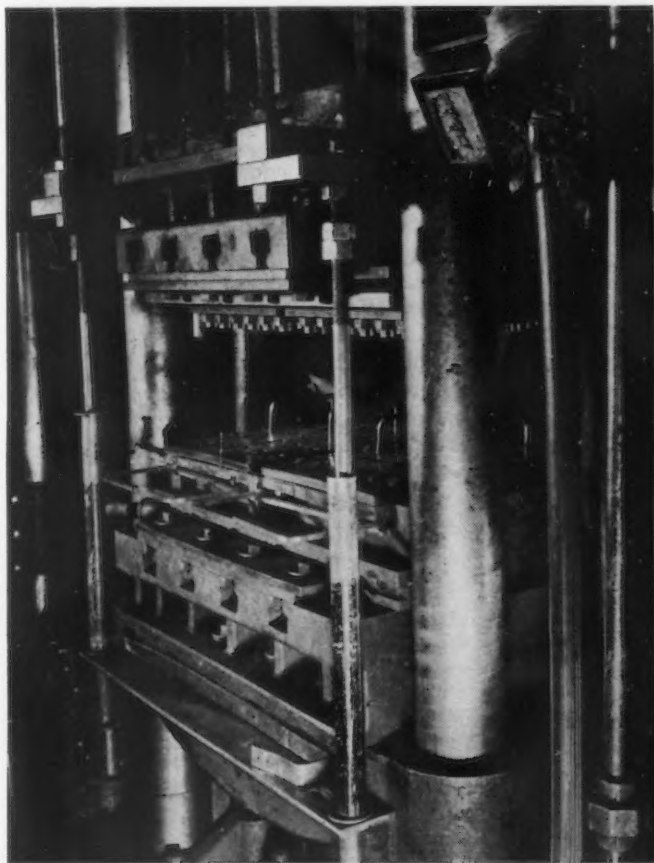
In producing these blocks, an 84-cavity mold is employed and a double-deck loading frame is used with it. To fill the frame, the lower deck is first charged level flush with the graphite-filled molding material. The upper deck is then fitted over the lower and preforms of impact material are placed in

the recesses of the upper deck. Then the loading frame is fitted over the lower half of the mold and the molding material and preforms are discharged into it. This results in the graphite material being next to each cavity surface and brings the preforms near the center where strength is required.

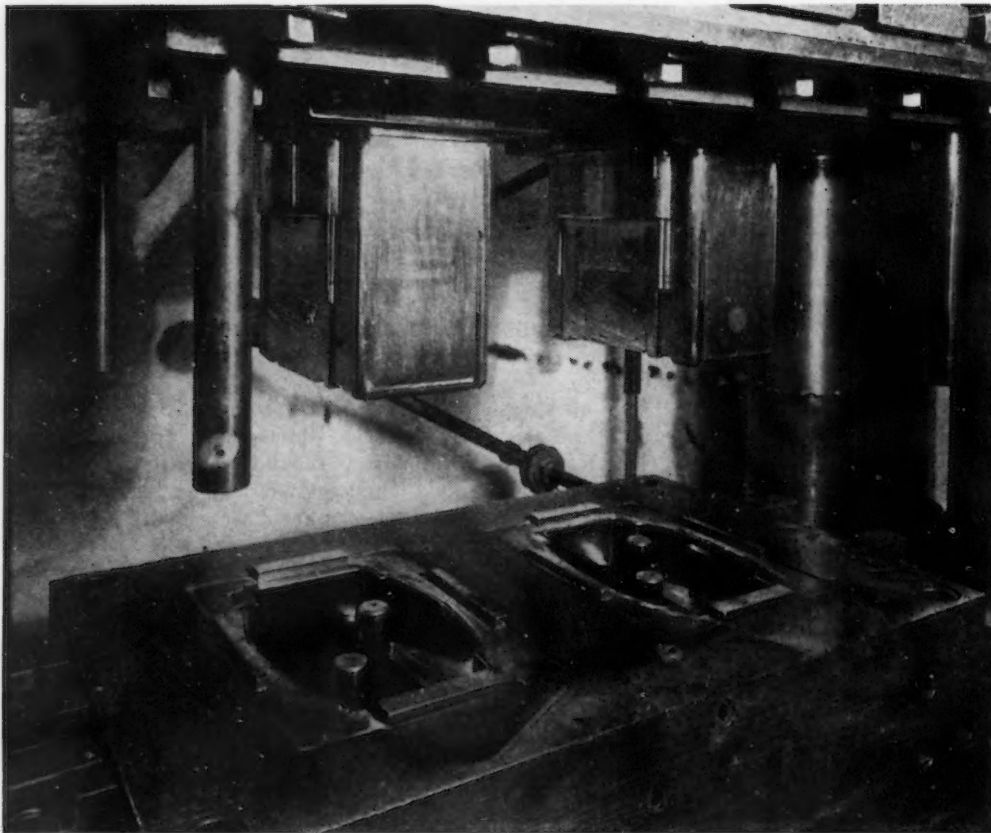
When the mold is opened, the molded pieces come away with the upper half. Upon withdrawal of the pins which form the cored holes, the bumper blocks drop into a tray.

Frequent tests of the bumper blocks are made to check their strength. For each test, five sample blocks, molded in the same cav-

MOLDING of phenolic dovetail bumper blocks, showing the 84-cavity mold and the two-deck fixture for loading the two types of compound, one self-lubricating, the other shock resistant.







○ ○ ○  
 ONE of several large molds in production on radio cases. These are produced in both phenolic and urea plastics, depending on the color desired.

○ ○ ○

ity, are placed one at a time in a specially designed impact tester, equipped with a 5-lb. weight. This weight is dropped on a bumper block from a height of 15 in. Blows are repeated until each block is broken. If the average number of blows required to break the five sample blocks is less than a given standard, steps are taken immediately to determine, first whether the material in use has the correct plasticity; second, whether the operator is adhering to the correct curing cycle; and third, whether the correct amount of material is being charged into the mold. These tests assure uniformity in the part and minimize the chance of rejection because of inadequate strength.

Among the molded parts produced in this plant are those forming the segments of a bowl of urea plastic for an overhead lighting fixture. Production of the segments is carried out in a four-cavity mold yielding about 88 pieces an hour.

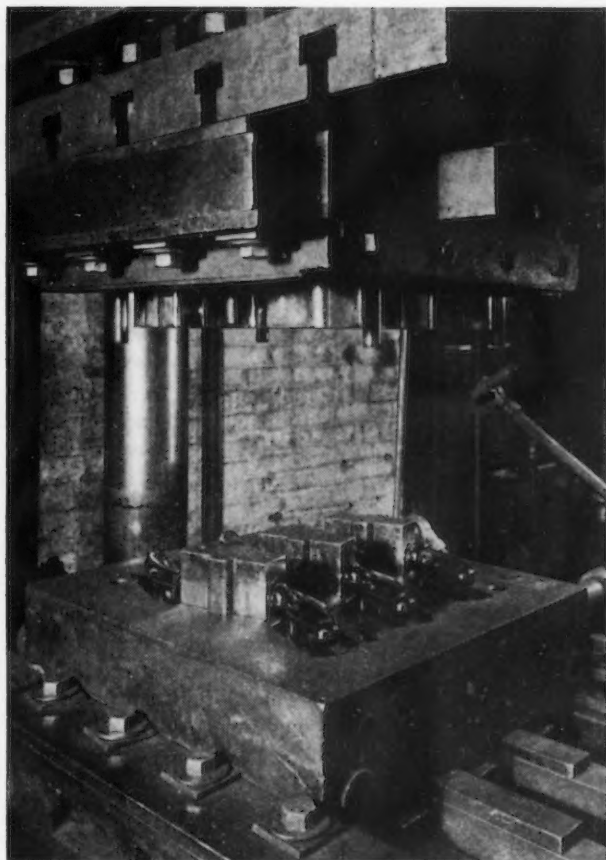
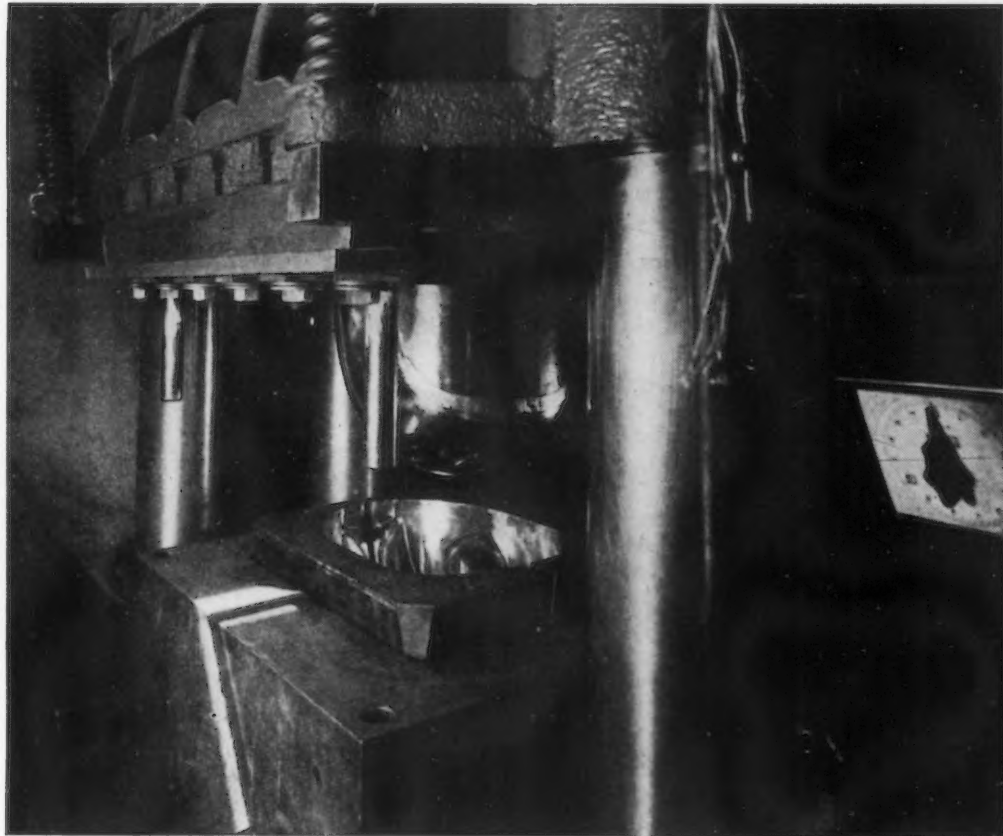
Molded gas-cock handles, some of which have die-cast inserts, are produced in molds having 15 cavities. Another form of handle is that produced from black Bakelite



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**L**ARGE mold in which hair-steaming helmets for beauty parlor use are produced. A split cavity made from two tapered blocks in a heavy chase is required to clear cores forming the smaller openings in the helmet.

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AT LEFT

**S**IX-CAVITY mold in which solid Bakelite handles are produced for the Eureka vacuum cleaner. Preheated preforms are employed, but the thick sections require a long cure.

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FACING PAGE

**D**RILLING of 10 holes in five gas range molded handles simultaneously on a Natco drill. A special quick-loading fixture is employed.

for the Eureka vacuum cleaner in a six-cavity mold. Preform used in this case are preheated to shorten the cycle, but as the section thickness averages about 1 in., a rather long cure is required. Six to seven charges are molded per hour.

Several different designs of radio cabinets, including the recent prize-winning cabinet molded for Sears-Roebuck, are among the rather large moldings produced. Cabinets are produced in a single or two-cavity mold, usually operating on a cycle of about 3 to 4 min., which gives the operator time to weigh out the charge.

Other large moldings include a 16-in. Rand-McNally terrestrial globe made in a single-cavity mold from a special high impact-resistant grade of Bakelite. These globes are built up by cementing together both hemispheres, which are produced in the same mold. Interchangeable split rings are used to form offsets for the stepped lap joint between the hemispheres, yielding a smooth surface at the joint.

(CONTINUED ON PAGE 119)

# GRAY CAST IRON

By SAM TOUR

*Vice-President, Lucius Pitkin, Inc.*



IMPROVEMENTS through the years in gray cast iron are indicated by Table I, wherein it may be seen that in 1918 iron castings were divided into three types, light, medium and heavy, and carried a specification for tensile strength of 18,000, 21,000 and 24,000 lb. per sq. in. respectively. By 1936, the gray iron industry had advanced sufficiently, however, that the American Society for Testing Materials' new tentative specifications list seven different grades of cast iron running from 20,000 lb. per sq. in. tensile strength all the way up to 60,000 lb. per sq. in.

Along with this great advance in tensile strength, there have been corresponding advances in load carrying ability as indicated by the transverse tests with the standard transverse test bars. Figures for these were not included in this table as it was desired to keep the data as simple as possible. As further improvements over these specified seven classes of the American Society for Testing Materials, the industry now has available the high test cast iron as indicated also in Table I.

It has always been considered in the past that cast iron is a material with practically no ductility,

but it is evident that the recent developments in the industry make it possible to produce a high test cast iron which after heat-treatment yields not only high strength, as indicated here, but also a considerable amount of elongation. These figures were taken from a paper prepared by R. S. MacPherran of the Allis-Chalmers Co.

In addition to the regular grades of non-heat treated cast iron as indicated by the A. S. T. M. specifications, there is available on the market now numerous other types of gray iron containing various alloy additions such as the nickel-chromium cast iron, the molybdenum cast irons, the special treated cast irons such as Meehanite. It would be impossible to attempt to give the trade names of all of the different cast irons on the market. Suffice it to say that most of them are cast irons made by processes where it is endeavored to accurately control the graphitization which takes place in cast iron during cooling and to thereby improve the mechanical properties of the metal as well as make more uniform the properties in thick and thin sections of individual castings.

The Alloys of Iron Research Committee is doing commendable work in this field, such as to review,

correlate, and condense all available knowledge on alloys of iron, including carbon and alloy steels and plain and alloy cast irons, as published in the literature of the world and as secured from co-operators in the form of unpublished data, and to publish the results in a series of monographs. These monographs also call attention to the gaps in the knowledge so that research may be done to fill these gaps. The monographs save time and effort attendant upon a laborious survey of previous work by each individual researcher, and prevent the waste of time in doing research work which has already been done but published in some journal not readily available to most investigators.

For the foundry industry, the following has been accomplished:

## Constitution and Structure

The scientific foundation for the constitution of cast iron has been laid completely in four chapters (50,000 words) in Epstein's "The Alloys of Iron and Carbon, Constitution," Vol. 1, and in two chapters (25,000 words) in Greiner, Marsh and Stoughton's "The Alloys of Iron and Silicon." In these discussions are reviewed, correlated and presented, in a form capable of being used by any trained metal-



lurgist, all of the data necessary for an understanding of the essentials underlying the constitution of commercial cast iron. In Epstein's book there is also an adequate discussion of metallographic structure and of heredity-effects in commercial cast iron.

A comprehensive summary of the properties of cast and malleable iron, including data on all of the variables which affect the properties, is given in Sisco's "The Alloys of Iron and Carbon, Properties," Vol. II, now being released. There are three chapters (35,000 words) on the ordinary properties and the variables affecting these properties. In other chapters are summarized data on fatigue, elevated-temperature properties, corrosion, physical constants, electric and magnetic properties, impact, damping, machineability, wear resistance and other miscellaneous properties.

All the data available in the world (up to the date of publication) on the effect of alloying metals on the constitution and properties of cast iron are reviewed in the various monographs published and in preparation, as follows:

(a) Greiner, Marsh and Stoughton: "The Alloys of Iron and Silicon"; "High-Silicon Cast Iron," 5,000 words.

(b) Gregg: "The Alloys and Iron and Molybdenum"; "Molybdenum Cast Iron," 20,000 words.

(c) Gregg: "The Alloys of Iron and Tungsten"; "Tungsten Cast Iron," 3,000 words.

(d) Gregg and Daniloff: "The Alloys of Iron and Copper"; "Copper Cast Iron," 15,000 words.

(e) In preparation: "The Alloys of Iron and Chromium"; "Low-chromium Alloys," Vol. I; "Chromium Cast Iron," 10,000 words.

(f) In preparation: "The Alloys of Iron and Nickel." A complete discussion of nickel and nickel alloy cast irons.

(g) In preparation: "The Alloys of Iron and Manganese." A complete discussion of the role of manganese in cast iron.

Planned for the near future is the preparation of a comprehensive monograph on cast iron. This will probably be written by J. T. MacKenzie. Included in the monograph will be a discussion of the constitution of ordinary and alloy cast iron in more elementary form than was used in the other monographs of the series in order that a thorough knowledge of the principles of equilibrium diagrams will not be necessary to use it. The properties of plain and alloy cast iron

will be discussed in more detail than was attempted in the monographs mentioned above. Furthermore, all the data published or made available subsequent to publication of the other monographs will be included.

#### A. F. A. Report

An important activity of the Gray Iron Division of A. F. A. is the project being carried out by a special committee to summarize the

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**I**N the past two decades gray cast iron has evolved from an uncertain status to become a recognized, dependable and inexpensive engineering material. This transformation is sketched by the author herein, and, also included, is a list of sources which contain all the world's known information about cast iron. The author also traces the improvement in malleable iron, steel castings and some of the more important non-ferrous alloys.

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available information on alloy cast iron and publish its findings as a special report. The committee, under the chairmanship of H. Bornstein, Deere & Co., Moline, Ill., and vice-president of the A. F. A., is composed of some 40 of the best known foundry metallurgists and research workers. The review work is sub-divided into sections which cover:

(a) "Metallurgical Theory Underlying Alloying."

(b) "Effects of the Various Alloying Elements."

(c) "Properties of Alloy Cast Irons."

(d) "White and Chilled Alloyed Cast Irons."

(e) "Heat Treatment."

(f) "Specific Applications."

(g) "Foundry Practice."

Preliminary reports of the sections on heat treatment, foundry practices and specific applications were made at the 1936 Convention of the A. F. A. in Detroit. At a meeting of the editorial committee held Nov. 13, in Chicago, the remaining sections were reviewed and final plans for publishing the complete report in the Spring of 1937 were made.

Another worthwhile development in the cast iron field is that of the permanent molding of cast iron. This work was largely pioneered by the Holley Carburetor Co. in Michigan where for quite a number of years they have been casting carburetor parts in permanent molds. This process produces gray iron castings of very uniform properties on a production scale somewhat beyond that which could be obtained in sand casting practice.

It would not be quite proper to leave the subject of cast iron even for the moment without first some remarks with regard to machineability. Machineability is not necessarily directly proportional to softness of gray iron, nor is its graphitic carbon content. The most important thing is the condition in which the combined carbon is present. Fig. 1 shows the structure at 500 magnification of a cast iron containing 3.55 per cent total carbon, 0.51 combined carbon, 2.35 silicon, 0.62 manganese and 0.42 phosphorus. It will be seen here that the structure is made up of a network of phosphide eutectics embedded in a matrix of pearlite and shot through the whole are numerous flakes of graphite. Pearlite is made up of alternate layers of soft iron known as ferrite and hard iron carbon compound known as cementite. This structure of pearlite makes it possible for the cutting edge of the tool to travel through it without the soft pure iron balling up on the point of the tool and ruining the cutting edge. It also makes it possible for the cutting tool to travel through the network of hard phosphide eutectics and break it up without damage to the tool. If, instead of having this ground-mass or matrix in the form of pearlite, it were present in the form of soft iron or ferrite, there would be an entirely different proposition. There would then be a soft iron as the binding material for a very hard and brittle material known as the phosphide eutectic. The structure would then be the same as a grinding wheel where the hard particles are available to wear off the tool and held in position by the bonding matrix.

In Fig. 2 there is such a structure in a cast iron which analyzes 3.42 per cent total carbon, 0.04 combined carbon, 2.17 silicon, 0.61 manganese and 0.30 phosphorus. It will be noted here that the phosphorus is somewhat lower than was

TABLE I  
CHANGES IN SPECIFICATIONS FOR CAST IRON

Year	Type or Class	Tensile Lb. per Sq. In.		
1918	Light castings, ½-in. sections.....	18,000		
	Medium castings, 2-in. sections.....	21,000		
	Heavy castings, 2-in. sections.....	24,000		
1936	20 .....	20,000		
	25 .....	25,000		
	30 .....	30,000		
	35 .....	35,000		
	40 .....	40,000		
	50 .....	50,000		
	60 .....	60,000		
1936	High test heat treated.....	75,000	14	per cent elongation
	High test heat treated.....	107,000	2½	per cent elongation

TABLE II  
PROGRESS IN SPECIFICATIONS FOR MALLEABLE IRON

	1915 A.S.T.M.	1930 A.S.T.M.	1936 High Strength for Railroads
Yield point .....		32,500	36,000
Tensile strength .....	38,000	50,000	54,000
Elongation in 2 in.....	5 per cent	10 per cent	18 per cent
Brinell hardness .....			100 to 140
Charpy impact .....			7.75

TABLE III  
PROGRESS IN SPECIFICATIONS FOR STEEL CASTINGS

Year	Type	Tensile Strength, Lb. per Sq. In.	Yield Point, Lb. per Sq. In.	Elongation on 2 In., in Per Cent	Reduction in Area, in Per Cent
1915	Class B soft .....	60,000	27,000	22	30
1915	Class B medium .....	70,000	31,500	18	25
1915	Class B hard .....	80,000	36,000	15	20
1924	Class B soft .....	60,000	45% of T.S.	24	35
1924	Class B medium .....	70,000	45% of T.S.	20	30
1924	Class B hard .....	80,000	45% of T.S.	17	25
1936	Pearlitic carbon steels:				
	Low carbon annealed.....	83,000	39,000	27	40
1936	Pearlitic carbon steels:				
	Medium carbon .....	84,000	47,000	19	30
1936	Pearlitic carbon steels:				
	High carbon .....	105,000	56,000	16	28
1936	Low alloy steels, heat treated:				
	Cr, Ni-Cr, V, Mo, Cr-Mo..	83,000 to 183,000	58,000 to 173,000	21 to 18	33 to 56

TABLE IV  
CHANGES IN SPECIFICATIONS FOR NON-FERROUS ALLOYS

Year	Material	Tensile Strength, Lb. per Sq. In.	Elastic Limit, Lb. per Sq. In.	Elongation in 2 In., in Per Cent	Reduction in Area, in Per Cent	Brinell Hardness
1910	Government bronze 88-10-2 .....	18,000 to 24,590	10,000 to 13,000	2.5 to 5.8	4.7 to 10.89	.....
1915	Government bronze 88-10-2.....	30,000	15,000	15	.....	.....
1936	Government bronze 88-10-2.....	35 to 40,000	.....	20 to 30	14 to 23	65 to 75
1915	Manganese bronze .....	65,000	30,000	.....	.....	.....
1936	High tensile bronzes .....	75,000	40,000	10	9	120
1936	High tensile bronzes .....	120,000	75,000	5	4	870
1915	Aluminum copper alloy .....	15 to 20,000	.....	.....	.....	.....
1936	Aluminum copper alloy .....	19 to 22,000	.....	1 to 2	.....	50 to 70
1936	Aluminum copper alloy, heat treated.....	30,000 min.	.....	3 min.	.....	70 to 90
1936	Magnesium aluminum .....	25,000	.....	4	.....	55

the case in the previous illustration, but due to the fact that the ground work is all ferrite and not pearlite, we have a material which rapidly wears away the cutting tool and is, therefore, not a good machineable material. The main difference between these two materials is the amount of combined carbon present and its disposition within the iron. Were the combined carbon present as large particles of hard iron carbide, it would still be difficult to machine, but with it present as pearlite it becomes a readily machineable material.

#### Malleable Iron

The progress of the foundry industry in the production of malleable iron is indicated somewhat by Table II, wherein the properties of malleable iron as called for in 1915 and in 1930, and the properties of some of the newer higher strength malleable irons for the railroads as being produced in 1936 are shown. Here it is quite evident that malleable iron has progressed from a material which did not have very great strength and but little elongation to a material of very considerable strength and very considerable elongation. These figures for the higher strength malleables are the result of thousands of tests made in production and reported at the symposium for malleable iron castings held jointly between the A. S. T. M. and the A. F. A. in 1931.

Special malleable irons with pearlitic and sorbitic bases subject to heat-treatment have been developed in addition to these higher strength irons for railroad work. Numerous examples of this type of malleable iron are on the market

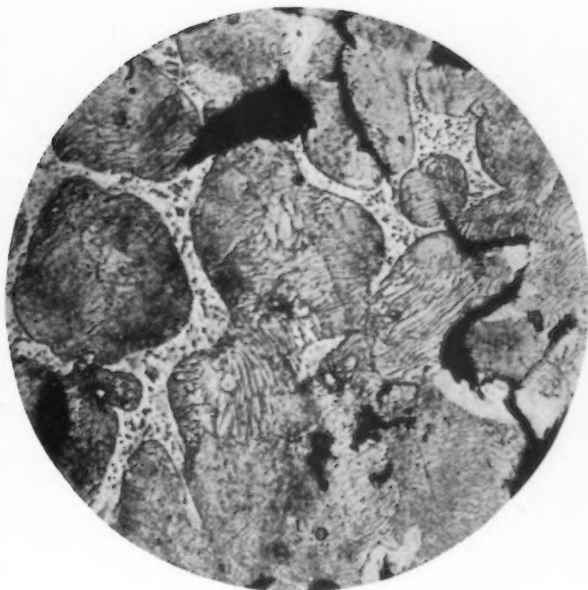


FIG. 1—The structure of this cast iron is made up of a network of phosphide eutectics embedded in a matrix of pearlite and shot through the whole are numerous flakes of graphite. This material machines well. At 500 diameters.

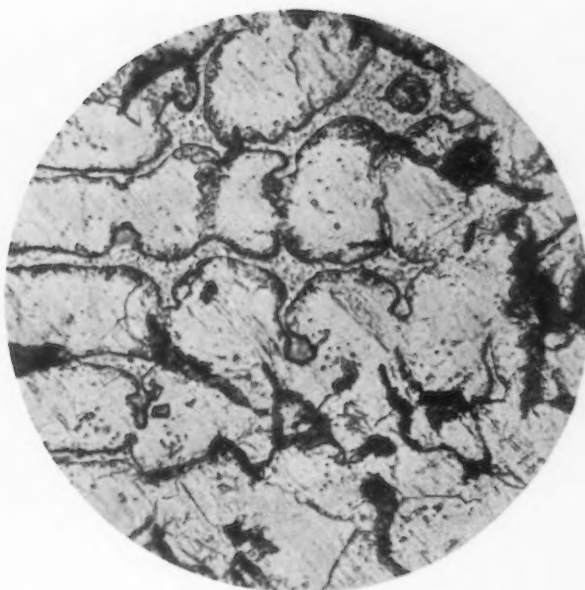


FIG. 2—The structure here is a soft iron matrix holding hard and brittle particles of phosphide eutectic. This is not a good machining material. At 500 diameters.

under various trade names and it would be impossible to discuss all of them at this time.

#### Steel Castings

Some 20 or more years ago, the American Society for Testing Materials divided steel castings into two classes A and B. For Class A, no tensile strength requirements were specified. For Class B, there were three sub-classes, soft, medium and hard, for which the specifications were as indicated in Table III. These were revised somewhat in 1924 and the requirements as to yield point changed slightly and the requirements as to elongation in 2 in. and reduction of area increased as again indicated. These specifications, however, are notably lower than obtainable in 1936 and now available in different types of steel castings. For example, pearlite carbon steel castings of low carbon content and annealed are available today with tensile strengths of 83,000 lb. per sq. in., yield point of 39,500, elongation of 20 per cent in 2 in., and reduction of area 40 per cent. Medium carbon pearlitic steels available today in the annealed and normalized condition show about the same tensile strength, higher yield point, and, of course, slightly lower elongation as indicated. High carbon pearlitic steels as normalized and annealed today show ten-

sile strength of 105,000 lb. per sq. in., yield point of 56,000 lb., and elongation in 2 in. of 16 per cent.

#### Non-Ferrous Alloys

Non-ferrous castings are made from so many different alloys that it would be practically impossible for anyone in one evening to discuss them all. Only a few of them can be considered, and by means of these few it is possible to point out some of the advances which have been made during the years. I have selected for this purpose standard Government bronze of 88 per cent copper, 10 per cent tin and 2 per cent zinc; manganese bronze of the 60 per cent copper variety with additions of various agents for increasing strength; and the aluminum-copper alloys.

The progress in these particular metals is shown in Table IV. In 1910 Government bronze was reported to have tensile strength of 18,000 to 24,590 lb. per sq. in., an elastic limit of 10,000 to 13,000 lb. per sq. in., elongation of 2.5 to 5.8 per cent and reduction of area of 4.7 to 10.8 per cent. In 1915, the specifications for this grade of material were increased to call for a minimum tensile strength of 30,000 lb. per sq. in., elastic limit of 15,000, and an elongation of 15 per cent. However, in 1936, the specifications or recommended practices of the industry call for tensile

strength of 35,000 to 40,000 lb. per sq. in., and elongation of 20 to 30 per cent in 2 in., and reduction of area of 14 to 23 per cent and Brinell hardnesses of 65 to 75. It is quite evident in this case that the improvement has been a result of more skillful melting, pouring and other foundry practices, because there has been no particular change in the basic composition of the alloy.

In 1915, manganese bronze was specified as a copper-zinc alloy containing up to 1 or 2 per cent each of manganese, tin or iron and having a tensile strength of 65,000 lb. per sq. in., an elastic limit of 30,000 lb. per sq. in. By improvements in foundry practice and by the development of other addition alloys to this base composition of the 60 per cent copper, 40 per cent zinc type, there was developed by 1936 the high tensile bronzes which show from 75,000 to 120,000 lb. per sq. in. tensile strength, from 40,000 to 75,000 lb. per sq. in. elastic limits, from 10 per cent down to 5 per cent elongation in 2 in., reduction of areas of 9 to 4 per cent, and Brinell hardnesses of from 120 to 270. Here the advance through the years has been not only in foundry technique, but in additional knowledge of alloys and alloying additions to produce a final product

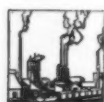
(CONTINUED ON PAGE 120)



# Industrial Railways Provide Unusual Services

By FRANCIS JURASCHEK  
*Consulting Editor, The Iron Age*

## CHAPTER II of a series on Materials Handling Methods.



FOR certain types of industrial work, nothing quite takes the place of the industrial railway. One of the oldest of all forms of industrial materials handling, its equipment has been thoroughly modernized to meet present day operating conditions, and now includes special forms of apparatus of highly ingenious design and construction. Even the older and simpler forms of equipment still perform services which, in some cases, are economically unbeatable.

Mention "industrial railways" to the average materials handling expert, and he will be apt to say, "Yes, I grant you their usefulness in mines, on construction jobs, and around sand, gravel and crushed stone operations; but as for their use in the manufacturing plant, the idea is hopelessly old-fashioned." I disagree. The facts indicate an entirely different conclusion.

Cite all the disadvantages of industrial railways you can think of, and still they hold a place in the economic sun. They require a fixed trackage system, and are therefore to a large degree inflexible. They require level runs of track (maximum gradients should not exceed 2 per cent at the outside) and are therefore useless for continuous runs within the plant from one

level to another. Speeds are relatively slow, equipment is cumbersome, investment is heavy—and yet, for various types of service no other form of materials handling equipment has ever been able to surpass the effectiveness of industrial railways.

What types of service? First, of course, as adjuncts to the service rendered by the standard railroad systems, which are only supposed to deliver empty freight cars to the plant and take away loaded cars, or, to deliver loaded cars filled with raw materials or parts, and take away either empties, or, preferably, cars loaded with finished goods. Once within the plant grounds, the shifting and spotting of cars for unloading or loading is a matter out of the hands of the railroad company, and in the hands of the manufacturer. So, we find industrial switching locomotives essential in any plant covering a large area of ground; where raw materials must be delivered in quantities to various receiving points, and where finished materials must be collected from many points in the plant for outside shipment. Using the car equipment of the standard railroads, the industrial track must of course be standard gage (5 ft. 8½ in.). But at times it may be advisable also to use the lighter forms of industrial railway equipment for collecting purposes, in which case the industrial gage of track may be 36 in. wide. Frequently three rails are laid for each set of track; the two

outside rails to standard gage, and one outside rail and an inner rail to narrow gage.

Second, industrial railway equipment in the heavy industries, such as iron and steel making, coke preparation and cement manufacture, is used as direct production aids; for uses such as cupola-charging, billet-handling, oven-charging, etc. Third, as in some respects competitive with cranes, in the service of distribution of heavy parts; as in the construction of engines, turbines, motors, generators, presses, etc. Fourth, as a means of bringing heavy or bulk materials in large quantities to large manufacturing operations, and taking therefrom semi-finished or finished parts to storage or to varying shipping points.

### Modern Equipment

Industrial railways and their equipment were at one time made by hundreds of manufacturers to all sorts of specifications. Nowadays (at least insofar as equipment for the manufacturing plant is concerned) the number of manufacturers has come down to about a score. One reason why this is so is because of the special type of equipment which modern practice demands. Aside from the means of locomotion (which is still largely a locomotive, although many self-powered cars are appearing) the bulk of the modern equipment consists of a car which includes some special type of materials handling apparatus incorporated in its de-

sign. Most of these designs are protected by patent rights and therefore are not available to manufacturers other than the patent holder except on a license or royalty basis. The days of the small car, of flat, box, or dump-body design, are practically over. Modern industrial railway equipment tends toward the big unit, designed for a particular function.

Locomotives may be powered by several means. The lighter types may be electric storage battery operated; medium sizes are supplied with electricity flowing through a trolley or third rail, may be operated by compressed air or steam, or may be Diesel-electrics. Larger sizes are almost invariably Diesel-electric, electric trolley or third-rail types, or, in a few cases, operated by oil-fired steam boilers.

Cars, when self-powered, may be operated by electric storage battery, trolley or third-rail systems. The majority of cars, however, are not self-powered, but are operated either singly or in trains by locomotives.

At times these cars must be so designed that they will enter ovens or other processing equipment where high temperatures or corrosive fumes must be withstood. For instance, in the manufacture of ceramics, special low-frame cars carry loads of materials through continuous-tunnel kilns, high-rack superstructure cars carry molded forms through drying ovens; and in foundries low-frame cars carry

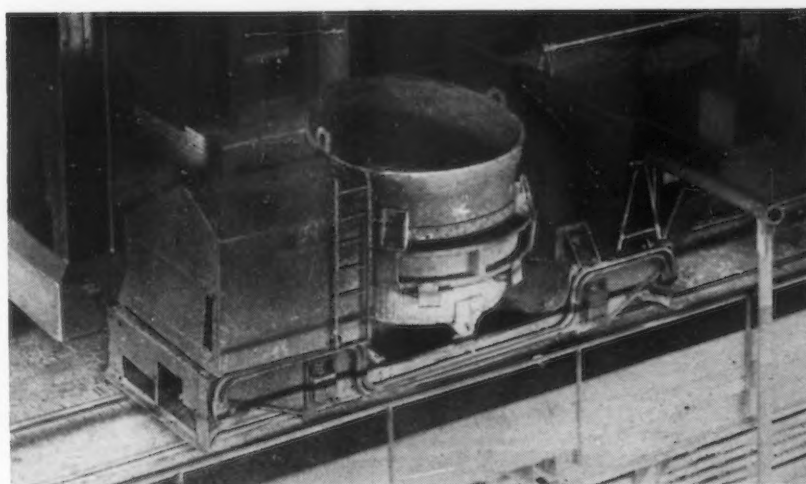


FIG. 1—27-ton hot metal ladle car used for transferring and pouring molten metal in a steel plant. Electric powered car operated by remote control. Car by Pennsylvania Engineering Co.; electrical equipment by Westinghouse.

castings through sand-blasting operations. One type of car carries a batch-mixer for accurately weighing and mixing batches of materials in transit from storage bins to molding machines, and another type is a batch-handling car equipped with an accurate scale to weigh bulk materials and automatically dump the batch through a bottom hopper into a mixing hopper located under and between the rails of the track.

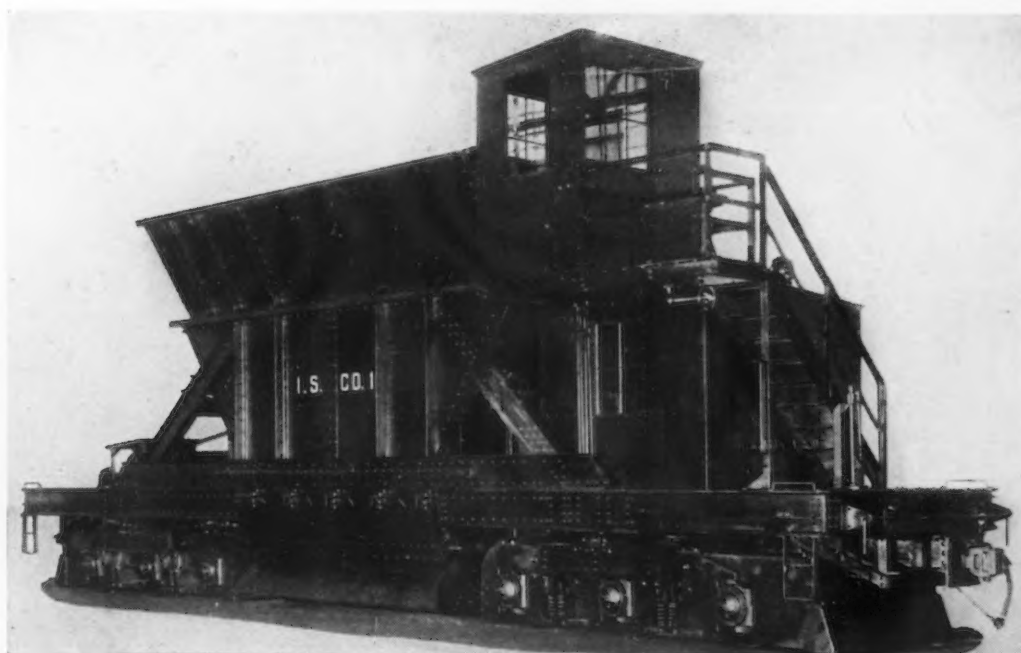
In large foundries a flat car may be equipped with various forms of cupola-charging apparatus and a scale to determine the correct quantities of materials for each charge. Other cars carry large ladles of various sizes for handling

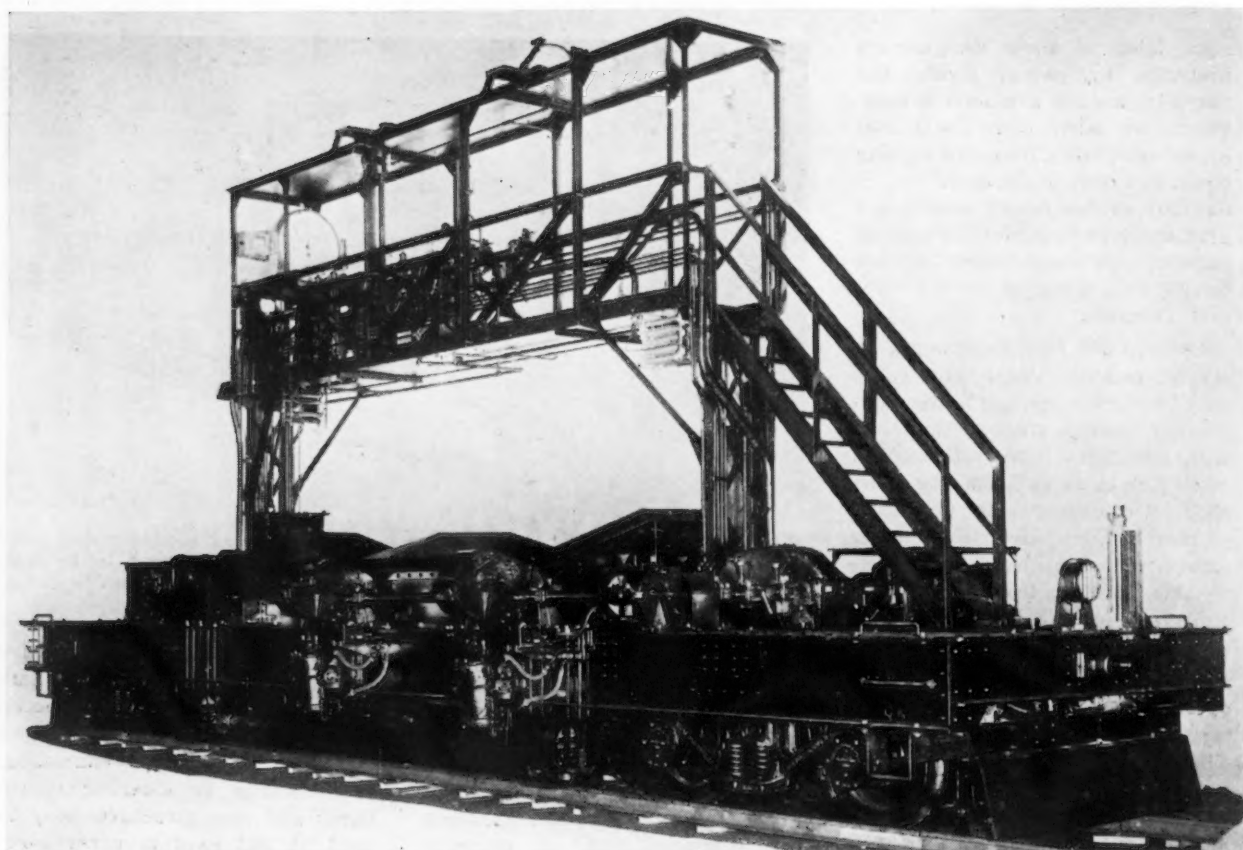
molten metal; dump bodies are available in many designs for handling raw bulk materials; special platforms are used to carry shapes through annealing, enameling, sand-blasting or cleaning operations; and rack structures may be used on flat cars to carry cores through baking ovens.

#### Description of Illustrations

The accompanying illustrations have been selected not so much to show the usual equipment and ordinary services performed by industrial railways, as to indicate by example some of the out-of-the-ordinary things that are being done today in American industrial plants.

FIG. 2—100-ton gable side ore carrying dump car used in blast furnace operation, electrically operated, running from ship-side to the furnaces. Car by Atlas Car & Mfg. Co.





**FIG. 3**—20 ton bottom dump scale car with two 230 cu. ft. hoppers, for blast furnace operation. Car and indicating and recording scale equipment by Atlas Car & Mfg. Co.; electrical equipment by Westinghouse.

Fig. 1 is a 27-ton capacity hot metal ladle car used for transferring and pouring molten metal in a large steel plant. The car is operated by remote control, since the heat renders it impossible for an operator to ride the car. From his remote station the operator spots the car accurately from cupola to pouring point, and pours the contents of the huge ladle safely. This car was built by the Pennsylvania

Engineering Co., and the electrical equipment, including the remote controls, designed and supplied by Westinghouse Electric & Mfg. Co.

Fig. 2 is a 100-ton capacity ore carrying car used in blast furnace operation. It is known as a "gable side dump car," and is self-powered. Each six-wheeled truck is equipped with electric motors taking current from a collector

rail. The discharge gates are operated by means of individual electric motors. The operator in his elevated cab has perfect air-brake control of every operation from the receipt of the ore from ship-side to the discharge into the blast furnace. This car is one of a fleet designed and built by The Atlas Car & Mfg. Co.

Another Atlas Car & Mfg. Co. special job is shown in Fig. 3. This



**FIG. 4**—Three Whitcomb yard switching locomotives, built by Baldwin Locomotive Works. The large one, for standard gage track is a 30-ton Diesel mechanical drive; the small ones, narrow gage, are each 16-ton gasoline mechanical drive.



20-ton capacity bottom dump scale car is likewise used in blast furnace operation, to handle accurate weights of materials for charging the furnaces. There are two 230 cu. ft. capacity hoppers, with bottom dump, equipped with pneumatically operated discharge gates. The elevated structure carries the

Mould & Foundry Co.; the electrical equipment having been designed and built by Westinghouse. The ingot carrying table is actually a section of a roll conveyor. The car, operated by remote control, carries the ingots over a track equipped with switches to any one of a number of roll con-

dumped through the track. Fig. 7 is an Atlas coal charging car built for wide gage track, carrying four hoppers with bottom discharge gates electrically operated, used to deposit coal through four separate openings in the roof of each oven of a by-product coke plant. The entire car is equipped with electric



FIG. 5 — Three Chesapeake & Ohio Railroad electric storage battery pusher locomotives, built by Atlas Car & Mfg. Co. for dock loading service.

Atlas indicating and recording weighing mechanism, and the trolley which collects the current for operation. This, again, is an electrically-self-powered car, with all operations in the hands of one operator.

In Fig. 4 are shown three Whitcomb locomotives, made by the Baldwin Locomotive Works, used for switching purposes. The large locomotive is a 30-ton Diesel-mechanical drive, for standard gage tracks; the two smaller ones are rated at 16 tons each, gasoline mechanical drive, for narrow gage tracks. Note particularly how a middle rail is used with standard gage tracks to form the narrow gage tracks, thus making the narrow gage locomotives available for light load work in connection with standard gage cars.

In Fig. 5, three Atlas pusher locomotives for narrow gage track are shown as constructed for loading dock service. Each locomotive is rated at 40 tons capacity, and is electrically powered from storage batteries. Equipment includes air brakes, pneumatic sanders, electrically heated cab and centralized lubricating system. These locomotives are used by the Chesapeake & Ohio Railroad for rapid load gathering and distributing work at terminal docks.

Fig. 6 shows an 11-ton capacity ingot transfer car as installed in a 54-in. blooming mill in Chicago. The car was built by the Wheeling

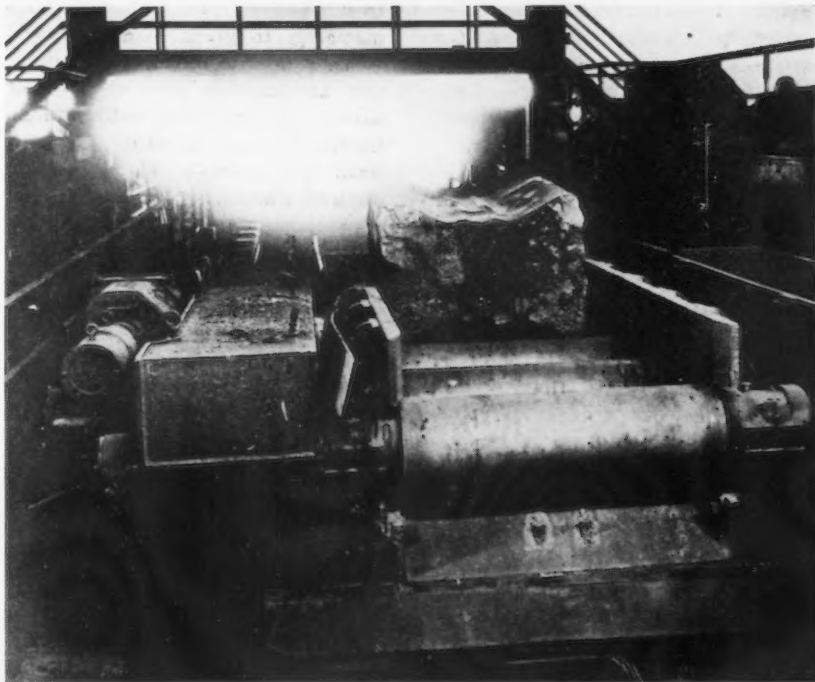


FIG. 6—11-ton capacity ingot transfer car, operated by remote control in a Chicago blooming mill. Car by Wheeling Mould & Foundry Co.; electrical equipment by Westinghouse.

veyors, from the soaking pits. At the junction with a conveyor, the rolls of the car table are electrically caused to rotate, rolling the ingot off the car table onto the conveyor. All operations of the car are handled by the operator at the remote control station.

Wide gage (approximately 7 ft. 0 in.) track is sometimes found desirable when materials are to be

drive, collecting the current from a third rail system. One operator controls all operations from the enclosed cab. Again this self-powered car is an Atlas product.

Fig. 8 is an Atlas 2½-ton capacity cupola-charging scale car, electrically driven from an overhead three-wire trolley system. The scale equipment, of Atlas design, indicates and records weights. There

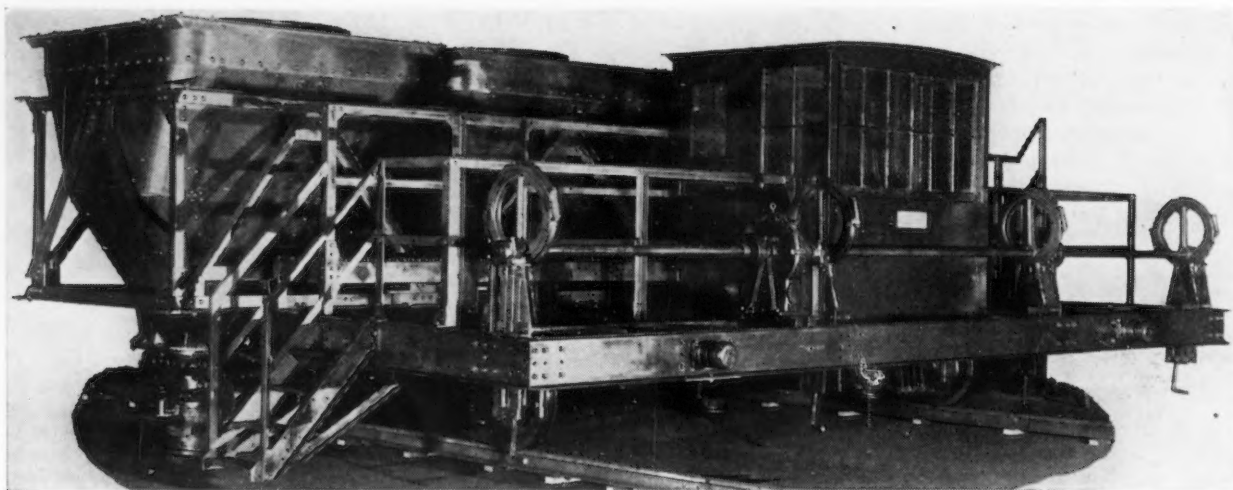


FIG. 7—Atlas wide gage, four-hopper bottom dump coal charging car, electrically operated. Discharges coal into four openings of a by-product coke oven.

are two sets of roller conveyors mounted on the car, with hand operated bucket stops and tilting mechanism. One set of conveyor rollers is mounted on the scale for weighing limestone and coke; the other set is mounted directly on the car frame for carrying empty buckets. All operations are under the control of a single operator.

#### Remote Control

It will be noticed that in several of the cases mentioned above, remote control is a vital factor of the operations. Functionally, this means control of the car and its operations from a distant point. It may be noted here, that remote control provides several possibil-

ities. One is, that a single operator can predetermine the movement of a number of cars in such a way that, having once started the cars in motion, they will continue automatically to given points without further attention from the operator, and having arrived at their several destinations, may unload themselves automatically, or wait until the operator closes certain circuits which cause the unloading operations to proceed under his attention. Such schemes are coming into widespread use in steel mills, coke plants, and other industrial operations of like character. Another factor of remote control operation is the factor of safety provided, when an operator stationed

on the car itself might be subjected to serious hazards. Generally speaking, any type of electrically driven car taking current from a trolley wire or a third rail, may be equipped for such remote control. It is particularly advantageous on large scale operations involving the dumping of loads of bulk material at predetermined points.

#### Fully Automatic Cars

A logical step beyond the remote control type of car is the car that is fully automatic in its operation; that is, requires no operator at all. Cars of this type have been built and are in successful operation in a small number of instances. It must be obvious that automatic op-

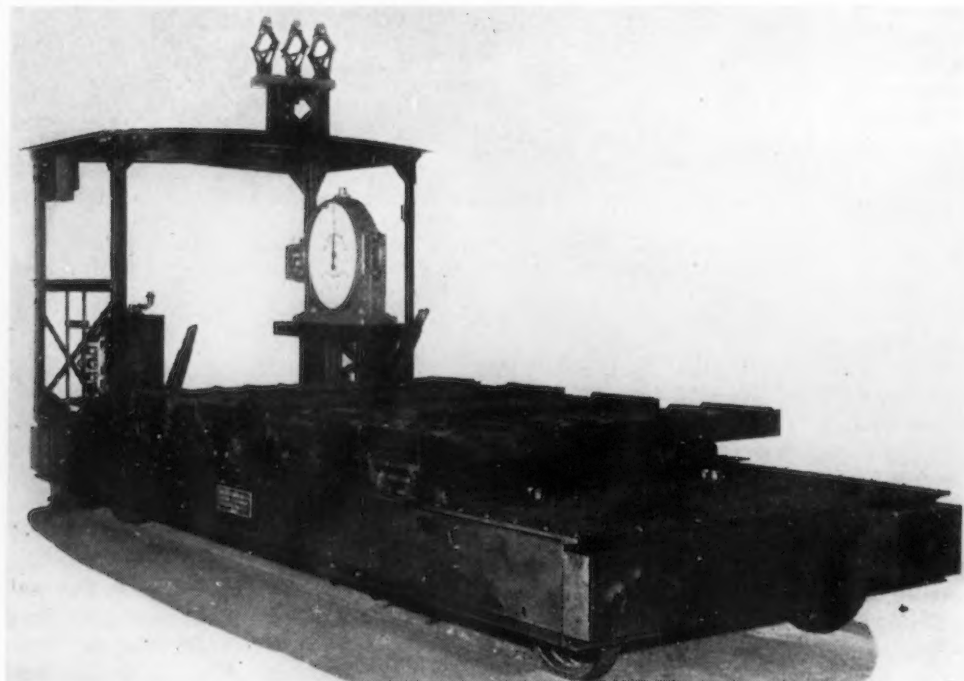


FIG. 8 — 2½-ton capacity cupola-charging scale car, electrically operated from an overhead three-wire alternating current system. Atlas Car & Mfg. Co.

eration is economically successful only where the conditions require the repetition of the same cycle of operations over and over again, such as, for instance, the filling of stoker bins for boilers from a central bin fed by a bucket elevator or skip hoist. Fully automatic cars may be considered directly competitive under many circumstances with belt conveyors or conveyors of similar types. Usually the installation cost of an automatic car is no greater than (and is sometimes less than) the installation of a conveyor, while the maintenance charges may be considerably less, and the power cost of operation much lower.

A fully automatic car may be made to pass around curves, or be switched to a different track, or move in any direction—matters of extreme difficulty for the conveyor design. Fully automatic operation may be arranged on either of two types of control; (1) the car moves on a definite time schedule, backwards and forwards, or (2) the car will not move until it is fully loaded, when the weight of the load actuates the starting operation, and will not return until it is fully unloaded, when the absence

of weight in the carrier causes the reverse starting operation.

#### Diesel-Electric Locomotives

The combination of Diesel engine and electric drive has become extremely popular for yard switching work in the past dozen years. In capacities ranging from 200 to 2000 hp., Diesel electric locomotives have demonstrated surprising operating economies. At the Bush Terminal Company in Brooklyn the smokeless operation of General Electric-Ingersoll Rand equipment of this type, rated at 330 hp., has completely displaced steam locomotives. The Chicago, Burlington & Quincy Railroad uses 460 hp. General Electric-Cummins Engine Co. Diesel electric switching locomotives in place of heavy steam equipment. In a Pennsylvania steel mill a 600 hp. General Electric-Cooper Bessemer Corp. Diesel electric locomotive moves a train of hot-metal ladle cars between the converter and the mixer. The Chicago yards of the New York Central System use 48 General Electric-ElectroMotive Corp. 600 hp. Diesel electric locomotives for switching service. From this point on to the 1800 hp. and 2000 hp. Diesel electrics used

by the Illinois Central for freight transfer service, one begins to get out of the realm of industrial railways as such and into standard railroading. But the scope of operations possible to this type of locomotive is indicative of its availability and its economic possibilities for the type of car switching, spotting, and general freight transfer work so frequently met in any plant of large scale operations.

Two things in large part tend to counterbalance the lack of flexibility inherent in industrial railways because of the fixed trackage system. One is the fact that practically no maintenance is required for the track system, as against the wear and tear on floors occasioned by the operation of industrial trucks. The other is that a properly designed layout of tracks, switches, and a turn-table gives all the flexibility needed for large scale operations in most plants.

When economically adapted to the services it performs best, and when installed in connection with plant operations where its operating characteristics can be utilized to the fullest advantage, the industrial railway is far from being a thing of the past, as the few examples cited here prove.

## Engineering Data Book On Resistance Welding

A 96-PAGE book bound between stiff covers has recently been published by P. R. Mallory & Co., Inc., Indianapolis, on the theory and practice of resistance welding. Profusely illustrated with photographs of actual applications, the book is divided into four main sections. The first is devoted to resistance welding methods, including spot, seam, projection, butt and flash welding; electro-forging, cross wire welding, electrical upsetting, and electro-percussive welding, besides several pages discussing timers for resistance welders. In the second section some of the problems met with in welding various materials are discussed. These materials include aluminum, coated steel, copper, stainless steel, nickel and monel metal, iron and low carbon steel, copper alloy and silicon bronzes.

The hard, high-conductivity alloys made by the company are described from the application point of view in the third section. These

include the proprietary materials Elkaloy, Elkonite and the various Mallory metals. In this connection an interesting table is presented giving recommendations for the proper electrode material when spot welding similar and dissimilar metals. The fourth section contains a number of usable engineering tables.

The book is available from the Mallory company at \$2.

## New Handbook on Vanadium Alloys

A COMPREHENSIVE discussion of the physical properties, chemical composition heat treatment, recommended applications, and fabricating procedure of all irons and steels in which vanadium is an alloying element, is presented in a 189-page, leatherette bound handbook recently published by the Vanadium Corp. of America, 420 Lexington Avenue, New York. The handbook is available free of charge to engineers and executives engaged in using or specifying alloy steels and irons. To others its cost is \$1.25.

## Sheffield Issues Booklet On Gaging

A N elaborately illustrated 112-page booklet on gaging has been issued by the Sheffield Gage Corp., Dayton, Ohio. Considerable space is devoted to descriptions of the company's visual gages and their use in precision manufacture. With the reed principle of magnification, movement of the diamond-pointed gaging element can be multiplied 500 to 10,000 times, making scale readings of as low as 10 millionths of an inch possible. Other sections are devoted to thread gages, thread measuring wires, cylindrical plug and ring gages, tapered plugs, and adjustable limit gages, besides special gages. In connection with the thread gages, a mass of tabular material relating to fits is published. A valuable part of the presentation is the four pages devoted to terminology, a needed adjunct to the highly technical descriptive material.



# Welded Steel in Railroad Service\*

By EVERETT CHAPMAN

President, Lukenweld, Inc.

WELDED alloy steels have met the basic requirements of high speed railroad service in producing structures of light weight and high fatigue strength, it was pointed out by Everett Chapman, Lunkenweld, Inc. To reduce weight and still have a serviceable structure in the face of certain hypothesized load conditions, the designer must choose a material that will enable him to work at higher stress levels than are usual with mild steel.

The measure of serviceability is the ratio of the average stress level to the maximum stress, wherever it may occur. Hence, when lightening a structure by raising the design stresses in a suitable medium, great care and attention must be given to sculpturing of corners and contours. This is important in high-speed railroad service where the dynamic augment may exceed values given by experience at slower speeds. The use of higher strength alloys working at higher stress levels does not by any means constitute an additional factor of safety, but, on the contrary, additional care should be taken to ease all boundary conditions where a change of direction is involved.

## Uniform Stress Distribution

Welded-steel designs should be scrutinized carefully with respect to details of the joints and boundary conditions. A welded-steel joint is either 100 per cent rigid or is broken. Complete rigidity of the welded joint is the seat of all the advantages and the cause of most of the troubles. It can, and will,

transmit the full bending moment applied to it, making the structure truly continuous. Because of this, it must be capable of transmitting the full moment and under repeated applications. Every detail of the joint must be carefully scrutinized for stress concentrations. The technique of making a joint exhibiting a uniform stress distribution must be thoroughly and rigidly defined for the fabricating shop. This is very often one of the controlling factors of the design. For instance, a completely closed box section cannot be butt welded satisfactorily to another completely closed box section so as to develop the full areas involved for a pulsating load, because the back of the weld cannot be treated to eliminate the unfused root of the weld made from the outside. Some ingenuity is necessary in this case.

Considerable thought must be given to selecting proper structural shapes which will best adapt themselves to the imposed load. For a member whose load is predominantly torsion, the tube is immediately available; if a load is chiefly bending, I or rectangular box sections are available. If the tube and the rectangular box must intersect, a transition casting or a pressed member that is nicely shaped to effect gradual changes of contour can economically serve as the joining member. A channel section for twist is a poor choice, and attempts to proportion this channel for torque result in a mathematical fiasco.

Another illustration of the same thing is the tendency to tie a load to its reaction in seemingly the most indirect manner possible. Certainly, the lightest member is one acting in pure tension. We sometimes have to use a C-frame to meet some space requirements, but

even so, in the interests of light weight, the throat should be as small as practicable.

One of the greatest hazards while the piece is being welded is the possibility of cracks that are undiscovered and remain in the finished structure when it goes to work. Steel and heat in combination can produce unbelievable results and the combination in the case of a welded structure can be most disturbing. The distinguishing feature of a weld is that localized application of heat always results in severe temperature gradients. This means two things: (a) rapid flow of heat from one place to another or quenching, and (b) thermal stresses are produced which do not vanish as temperature equilibrium is established.

Quenching parent metal by rapid flow of heat from the hot zone around the weld to the colder ones away from it is to be considered hazardous only if the nature of the parent metal is such that it will harden. Hardenability is, of course, a function of the same variables as high strength; namely, carbon content and, to a lesser degree, alloy content. Thus, the steelmaker when asked to produce high-strength welding steels is immediately faced with the problem of producing high physical values at low carbon contents. One of the best steels is the low-carbon manganese-molybdenum type, with 0.18 per cent of carbon representing the maximum content that will be trouble free. While its physical properties at low carbon contents are not as high as some of its contemporaries, it is one of the most fool-proof, dependable steels on the list and welds beautifully. When considering the manufacture of alloy steel with this low carbon content, the nature of the alloys must be

\*Abstract of a paper presented before the Semi-Annual meeting of the American Society of Mechanical Engineers, Detroit, May 17 to 21. The article on "Grinding of Cemented Carbide Milling Cutters," which appeared on p. 51 of the June 17 issue of THE IRON AGE, was also an abstract of an A.S.M.E. paper.

such that they can be introduced in the steel without oxidizing. Otherwise, the steel will be excessively dirty and laminated, a condition that makes it unusable in a welded structure since, contrary to a riveted structure where the rivets work in shear against the entire cross section of the plate, the steel can be loaded in three directions.

Thermal stresses can be easily equal to the yield point of the metal, and, further, the system of stresses can be such that the apparent or working ductility of the steel is reduced to 10 per cent of the tensile-test value. At some point in the region where the temperature gradient is high, the yield point of the material is exceeded. A plastic deformation occurs, and the hotter metal will upset, becoming thicker and shorter than it was with reference to the initial temperature. As the piece cools, this shorter and thicker region now pulls against the initial constraining portion, and, in the final state of temperature equilibrium, a complex two-dimensional state of internal locked stress exists. Its severity is a function of the initial temperature gradients and the adjacent rigidity.

If the steel is hardenable, a highly quenched non-ductile zone will exist in the neighborhood of these heat stresses, and, more than likely, a crack will occur under these conditions. These fabricating cracks are difficult to locate and repair and may exist in the finished structure where they are a source of failure under fatigue load.

The phenomena just outlined are reasons why every welded-steel structure for high duty should be heat-treated. The temperature should be high enough to restore some ductility to the hardened zones, and the time in the furnace should be long enough to allow the internal stresses to readjust themselves. Readjustment of the total structure to eliminate or minimize residual stresses is a phenomenon of creep. Sufficient time at the stress-relieving temperature must be allowed for the material to flow. Temperatures of 1200 F. have been found to be adequate while 2 hr. per in. of maximum thickness seems to remove all residual stresses of practical consequence. Behavior of the welded structure while it is being machined is a good indication of the state of stress. A squirming structure is not free from stresses.

#### Effect of Thermal Stresses

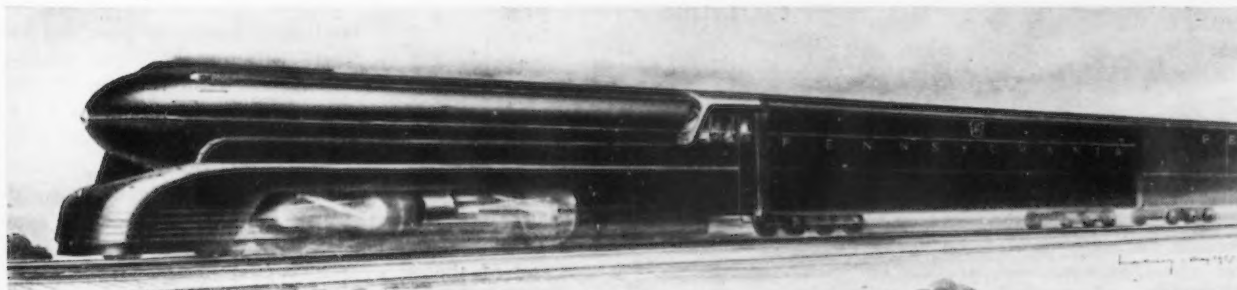
The two-dimensional nature of thermal stresses in flat plates may have serious consequences. The stresses exist in two directions because the temperature gradient existed in two dimensions. The second set of tensile forces at right angles to the first inhibit the normal lateral contraction of the steel as expressed by Poisson's ratio, and, under these conditions, shearing action cannot take place. The steel shows an apparent ductility of about 6 per cent. A practical case where this mechanism actually causes failure occurs in the bending of long thick plates for pressure-vessel shells. If a piece of steel

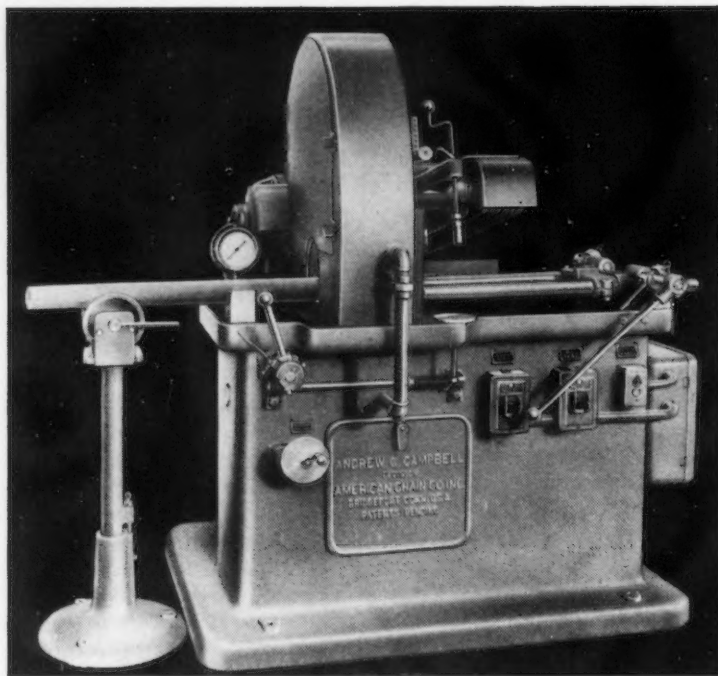
120 in. square and 3 in. thick is bent in a bending roll to form a shell, the steel will break at an elongation corresponding to about 6 per cent, in contrast to its original ductility of about 30 per cent. This is due to inhibition of lateral deformation by the remainder of the plate outside the bend line. These shells must be bent either hot or in a series of small arcs whose incremental change does not represent a plastic stretch of more than about 5 per cent.

In a welded joint, the combination of hardened zones and odd thermal-stress systems may have a third inherent evil present to insure that the joint will not withstand fabrication stresses or a fatigue load in service. The root of a weld, where the first bead was deposited, is difficult to fuse thoroughly. The beveled groove is an acute angle, and the molten pool freezes before it can melt the sides near the bottom. As a result, an internal crack is formed in the interior of the weld, which is that portion of the boundaries of the two original plates that were not fused together when the joint is integrated with the arc. These unfused boundaries form internal discontinuities that may be very abrupt and sharp. To make a butt joint with no internal crack necessitates chipping from the back into the first bead and then resealing the groove with a weld from the side that was chipped. Such a butt joint will exhibit properties under any kind of load that are equal to, or better than, the parent metal.

## New Pennsylvania Railroad Streamliner

**D**ESIGNED to operate at a sustained speed of 100 m.p.h. while pulling 14-car passenger trains, this new streamliner represents the latest in design and efficiency in coal burning locomotives. This "Pennsylvania Type" engine employs four cylinders, in place of the conventional two. Each pair of cylinders provides power for two pair of driving wheels. The tender will have a capacity of 25,000 gal. of water and 26 tons of coal. Cooperating with the railroad in the design of this locomotive, are the Baldwin Locomotive Works and American and Lima Locomotive companies.





## Abrasive Wheel Cut-off Machine

A NEW principle of abrasive cutting whereby the arc of contact remains constant in cutting any thickness of stock is a feature of the "Cutamatic" machine manufactured by the Andrew C. Campbell division of American Chain & Cable Co., Inc., Bridgeport, Conn. A uniform arc of contact is maintained by a combination of oscillating and rotating increments of the hydraulically fed abrasive cutting wheel. With this design, true-to-size cuts can be made on bars up to 6 in. in diameter. Furthermore, it is claimed the machine finishes as it cuts, thereby saving costly finishing operations. There is a minimum of burr and complete absence of burning, surface hardening and glazing.

In some cases, on high-speed steel, savings amounting to 1 or 2 lb. per cut can be made on larger sizes, because thinner abrasive cutting wheels are used. These abrasive wheels are 10 to 20 in. in diameter, and all are 3/32 in. thick except the 20 in. diameter wheels, which are 1/8 in. thick. The machine cuts equally well materials that are hard or soft, alloyed or low carbon.

Through an equal distribution of coolant on both sides of the abrasive wheel, an equal temperature on

both sides is maintained, thus insuring a flat surface on the face of the wheel and producing straight cuts, besides reducing wheel breakage. Through the use of coolant, grit and dust laden air is eliminated, an important advantage from the standpoint of safety and the health of workmen.

While primarily designed for cutting solid bar stock, the Cutamatic is equally effective on tubing of any wall thickness and flat or slab materials as well as formed sheet materials. Three material holder stands are furnished as standard equipment.

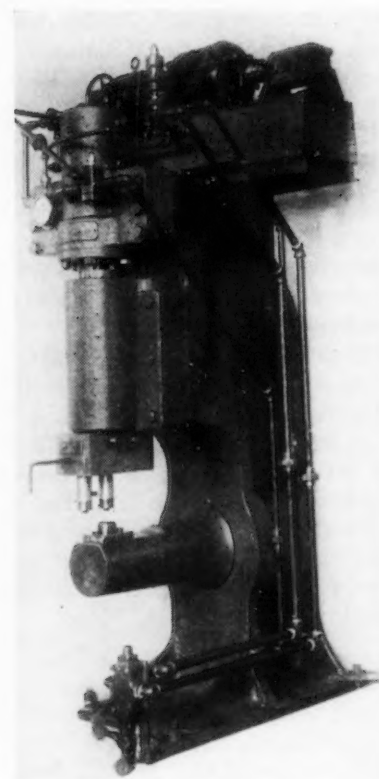
The Cutamatic uses standard, squirrel-cage, open-type motors, since all dust and dirt is retained in the wheel guard.

## Hydraulic Press For Closing Boiler Spuds

THE Chambersburg Engineering Co., Chambersburg, Pa., has recently designed a hydraulic press for inserting and closing 1-in. boiler spuds in two operations, on 12-in. and 24-in. diameter boilers. The distance from the end of the

shell to the centerline of the spud is 20 in. In essence, this unit is a 75-ton hydraulic plunger-type, gap-frame horning press. The height above the floor to the spudding die is approximately 38 in. Stroke of the ram is 6 in. with 16 in. open space between the face of the ram and the horn at the top of the stroke. Cycle time is 6.7 sec., including 1 1/4 in. closing stroke, 1/4 in. pressing stroke, one second ram dwell, 1 1/2 in. return stroke; and a second operation consisting of 1 3/8 in. closing stroke, 1/4 in. pressing stroke, ram dwell and return stroke.

The ram is guided by gibs on the frame and is provided with a double sliding upper die holder to



set 3/4 and 1-in. spuds. Special provision has been made to assure that the center of the operating spudding die is in axial alinement with the cylinder of the press.

Hydraulic power is provided by a Northern pump driven by a 5-hp. motor mounted on the top of the press. It controls the press by a hand-operated valve conveniently located and provided with positive automatic control of the upward travel of the ram, so that the ram may be operated either up or down over any part of the stroke.



## Flash Butt Welder For Boiler Flues

THE model F-21 flash welder has been developed by the Thomson-Gibb Electric Welding Co., Lynn, Mass., especially for service in railroad flue welding. It has all of the features generally applied to Thomson-Gibb flash welders plus several special features which make it particularly well adapted to safe ending or salvaging work.

The 150-kva. transformer is offset in the frame to provide a direct path for the flash dirt to drop to the floor without striking the transformer core or coils. The slide bearings are set out at the ends well away from the line of the flash and the piston rods and linkage which operate the air clamps are shielded by a flash-proof hood.

Push-up pressure is supplied by a hydraulic pressure cylinder and an oil pressure pump. For greater convenience and to provide more accurate control, the hydraulic pilot valve is regulated by an unusually long lever so that the operator can more easily govern the speed and travel of the platen.

The dies for the smaller flues are

through 10 points of heat regulation. Five points of regulation are obtained through a 5-point switch on the machine and the other five are obtained by a simple change of

connections on a terminal board.

The model F-21 welder is suitable for flues from 1¼ to 6 in. in diam. and standard pipe up to 4½ in. O. D. Welding rates are 40 to 150 per hr. on small sizes and 25 to 35 on the larger sizes.

## Precision Jig Boring Machine Features Ease of Control

OUTSTANDING features of the Type 48 precision jig boring machine shown in the accompanying illustrations are great rigidity, extreme accuracy of construction and ease of control. This tool was recently designed and built by the Cleveland Universal Jig Co., 13404 St. Clair Avenue, Cleveland.

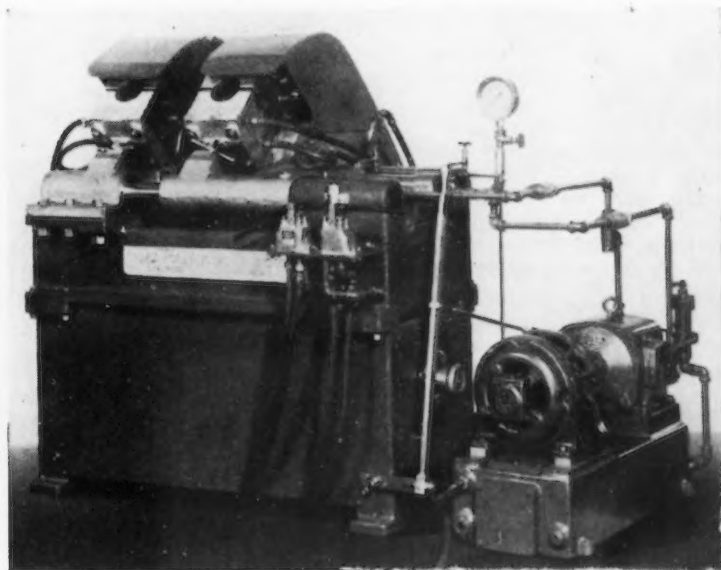
The base is of box type design ribbed to eliminate vibration and is provided with one flat and one V-way. The table has a working surface of 40x60 in. and is provided with eight T-slots and one aligning slot at the center. The table longitudinal screw is fitted with a

vernier dial graduated to thousandths of an inch. Accuracy of settings made with the dial and vernier are, of course, governed by the accuracy of the screw itself. To provide further accuracy a vernier slide runs the entire length of the table and by means of this slide it is possible to make settings with even great accuracy. Adequate means are provided for lubricating the table ways and ample provision is made to protect them from chips. The table screw is driven by a ½-hp. motor, controlled by a conveniently located push-button.

The uprights are securely bolted and doweled to the base and are fastened at the top with a crosstie. These housings are hollow and accommodate the counterbalances for the crossrail and spindle saddle.

The crossrail is fitted with a traverse screw provided with a vernier micrometer dial, while a ver-

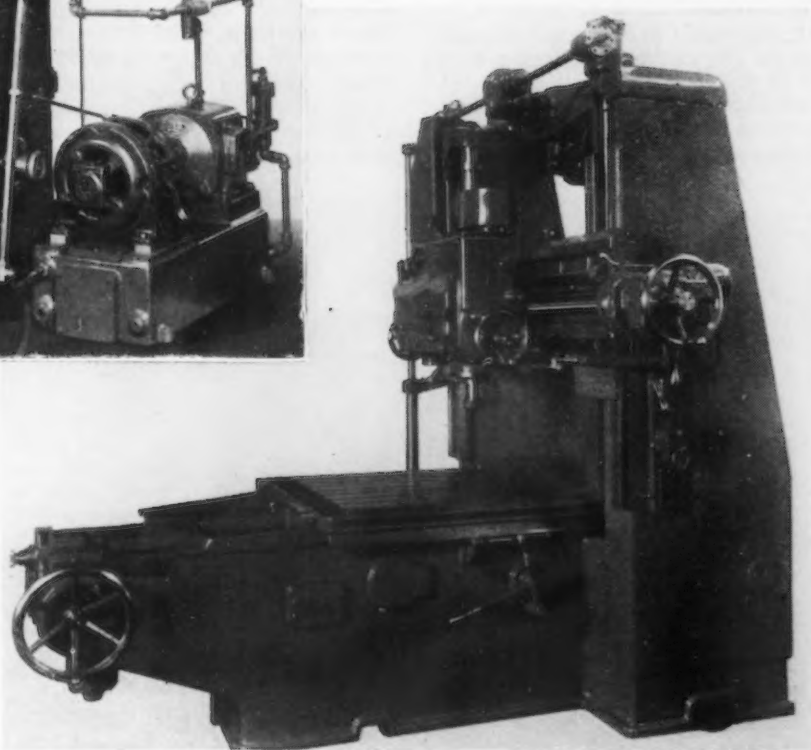
**S**PECIAL features adapt this flash welder for railroad flue shop work.



arranged so that two different sizes can be handled by one set of die blocks. Separate sets of dies are required for flues over 4 in. in diameter. The dies are water cooled and are adjustable for vertical alignment by means of hand wheels and can also be moved on the jaw members. The clamps are made of special bronze and both dies are mounted on a special current carrying hinge pin so that the current feeds uniformly to the top and bottom jaws.

Accurate heat control is provided

**P**RECISION jig boring machine recently built by the Cleveland Universal Jig Co.



nier slide is also provided to facilitate the making of correct cross settings. The crossrail is raised and lowered by a  $\frac{3}{4}$ -hp. motor with push-button control.

The spindle saddle is massive in construction and is fed across the crossrail by a  $\frac{1}{2}$ -hp. motor provided with a push-button control. Hand control wheels are also provided for the table, saddle and spindle movements.

The spindle is driven through the medium of a  $7\frac{1}{2}$ -hp. New Departure Transitorq motor which

provides a variable speed. For high speeds, power is transmitted to the spindle through four V-belts from a vertical shaft on the spindle housing. One object of the V-belt drive is to eliminate all vibration to the spindle. Lower speeds are obtained by means of worm gears. The spindle operates in precision ball bearings of large size. The spindle nose has a taper of  $3\frac{1}{2}$  in. to the foot, but chucks and boring tools are held in place by means of a screw retainer at the spindle bottom.

gear and regulated by spring pressure. An oil cylinder with by-pass valve, mounted on the side of machine serves to hold the saw frame unit at the top of cutting cycle until the stock is fed to the exact length required. The measuring bar opens the valve as it advances with the stock, permitting the frame to start down and the time of suspension of the frame is automatically regulated by the length of the piece to be cut. Power is taken from a motor located on top of the machine, through a V-belt to a clutch pulley mounted on the lower shaft of the machine. This clutch is disengaged only when the machine is being manually operated.

## Automatic Metal Sawing Machine

A HIGH-SPEED metal sawing machine, built in 10 by 10-in. capacity, and so designed that it may be used either fully automatic for cutting duplicate pieces, or by shifting one lever it can be changed to a manually operated machine, is in production by Rasmussen Machine Co., Racine, Wis. Arranging the machine for automatic operation, requires less than 2 min. A counting dial, numbered, can be set to cut any number of duplicate pieces up to 100. When the indicated number has been cut, a trip stops the machine. If more than 100 pieces are to be cut from one bar, pressing the starter button will start the machine on the second 100. If stock is exhausted before the dialed number of pieces is completed, another trip stops the machine.

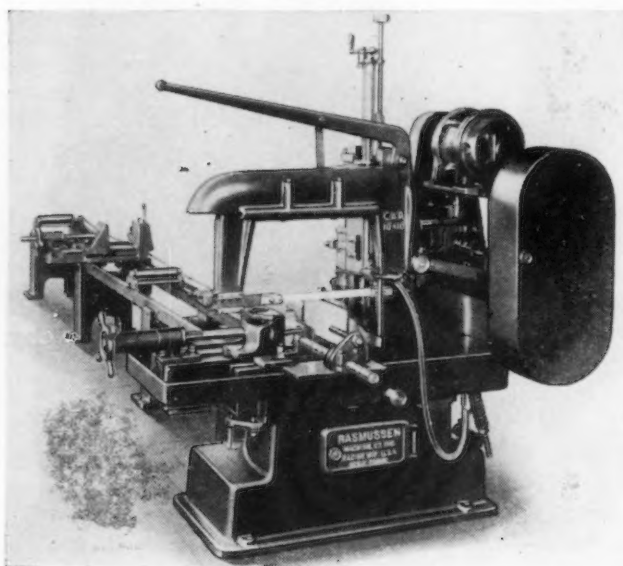
A steel scale graduated in 32nds from  $\frac{1}{32}$  to 24 in. is mounted on an automatic spacing bar located on the side of the stock feeder, with an indicator to be set to length of cut to be made. An adjusting screw permits of further adjustment for different thickness of saw blades.

Using a spacer bar, instead of gaging from the end of the stock, allows a machine to be used for multiple slotting. All adjustments required for cutting different sizes of stock, are made by turning one crank, conveniently located on top of the machine, which sets three timing gears, controlling depth stop, elevating stop and opening and closing of the vise. The same gear that operates the vise control also controls the stock feeding mechanism.

For making angular cuts, the machine is swiveled on its base by means of a king pin located on the vise and saw line, the body turning on a semi-circular track on top of the base. It is locked in any position up to 45 deg., by means of two quick-acting clamps. The vise, which is graduated up to 45 deg., also swivels on the same pin on which the table turns. The transmission, giving speeds of 60-93-144 f.p.m., consists of a three-step V-belt drive. The feed mechanism is of compensating type, positive cam operated through a rack and

## Push Button Station With Mushroom Head

A SLAP of the open hand on the mushroom head of a new General Electric push-button station will suffice to stop a machine controlled by the device. It is particularly suitable for use on ma-



CHANGE from automatic cutting of duplicate pieces to manual operation is made by shifting one lever.

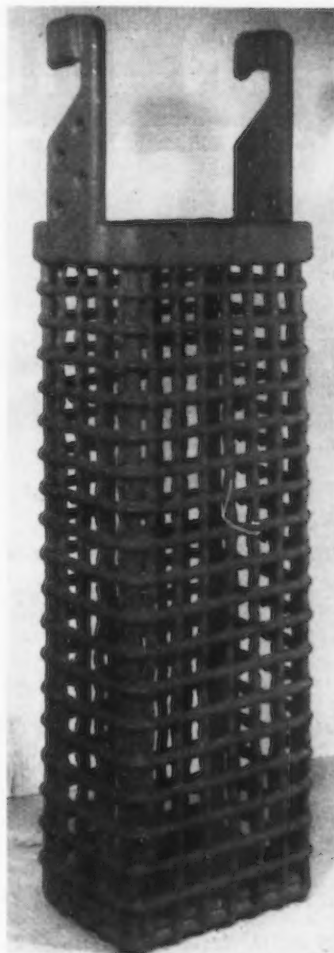
chines where it is necessary for the operator to wear heavy gloves or asbestos mittens. A mushroom head projects from the front of the button so that it is a simple matter for the operator to slap the button when a rapid, positive shut-down of the machine is required.

Essentially, the new push-button is of the same general type of construction as the standard G-E heavy-duty push-button station, except that the molded "stop" button, to which the mushroom head is fitted, is approximately  $\frac{1}{2}$  in. longer than the stop button on standard equipment. The mushroom head is screwed to a metal insert in the end of the button.

## Latex Spray and Dip Process for Plating Equipment

**C**HIEF among the recently discovered industrial applications of latex rubber is one of particular value to plating shops and metal-working and chemical industries. Seamless rubber insulation, dipped or sprayed, is being applied extensively by Collord, Inc., Detroit, to steel vats, plating tanks and accessories. Because of the protection against corrosive reagents, the racks, plating barrels and dipping baskets are made lighter, therefore at less cost. Results of a representative number of installations indicate lower initial costs and improved operating economy. The rubber lining is applicable in all but chromium plating operations.

One seamless rubber-lined tank recently installed in the Detroit area is over 100 ft. long. The rubber, compounded from latex by Collord, is applied to the surface by spraying, building up the required thickness in a seamless, practically blister-proof coat. At corners and joints the fill is complete and smooth, with no edges exposed. Greater efficiency in these rubber-lined tanks is attained through use of rubber-insulated racks and baskets. Rubber-lined drums and round



**A**NODE scrap can be used up in the plating tank with this latex insulated container. In use, one good anode in the center of this basket is hung from a bus bar and anode scrap is piled into the basket in contact with the good anode.

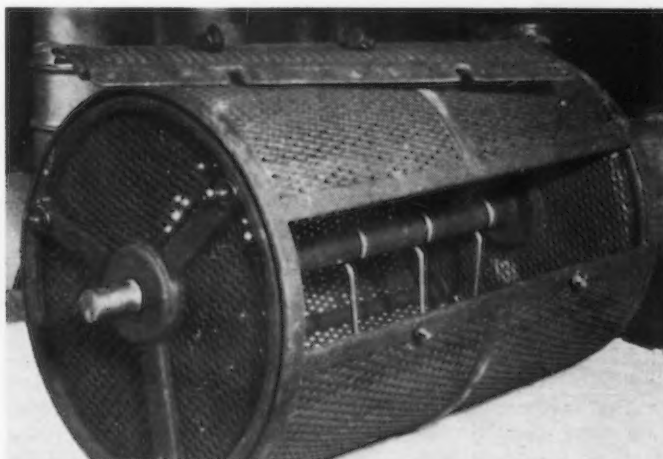


**D**IPPING baskets and similar accessories can be lighter when rubber insulation wards off corrosion.

tanks are being used by platers to replace heavy, unwieldy crocks and stone jars. Dipping baskets and plating barrels also can be treated to advantage. Deposition of metal on the metallic accessories is avoided and salvaging expense eliminated. By use of high cathodic insulation, deterioration of equipment is greatly reduced. It is claimed that generator requirements are cut 50 per cent, since rack area frequently exceeds the specimen area. Exact specification plating is easier, because insulation of the racks permits better control of current. Adulteration by drag-over and losses by dragout are reduced, thus avoiding serious solution problems.

One of the most unusual applications is the anode scrap saver illustrated. This is a deep metal basket made to hang in plating tanks. It is insulated with a semi-hard rubber and will carry loads up to several hundred pounds. Hanging on a bus bar with one fresh anode in the center, it is then filled with anode scrap. The use of waste is said to be efficient enough to pay for an installation through one loading.

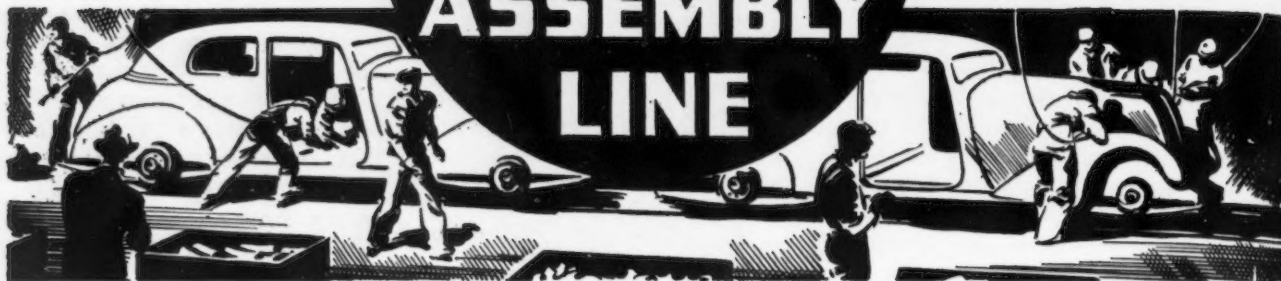
The development of latex products has also led to manufacture of a rubberbase paint, called Surfaseal, with a wide range of industrial applications.



**P**LATED barrels are more efficient after insulation is applied, because power costs are cut, inefficient deposition of metal is eliminated and adulteration of the bath prevented. Such protected plating equipment can be used with cadmium, tin, zinc and nickel.



# THIS WEEK ON THE ASSEMBLY LINE



*... Automobile labor difficulties also have "a seasonal slump" and UAW tactical experts decree discipline for unruly strike callers.*

o o o

*... CIO resorts to direct political action in Detroit municipal election, naming its own slate and its own platform with union officers as candidates.*

o o o

*... Chrysler will have new assembly plant just outside city; General Motors announces New Jersey plant and expansions of present stamping divisions.*

o o o

*... Auto production drops again because of strikes, but General Motors still has some distance to go to fill its orders.*

**D**ETROIT, June 21.—For the first time in months, Michigan today is experiencing virtually a strike-free existence. As predicted here a week ago, there has arisen enough pressure through public sentiment to stir politicians and the unions into an about-face that has halted suddenly the orgy of strikes, riots and labor holidays plaguing the State. Naturally there may be some further outbreaks but none is on the horizon now.

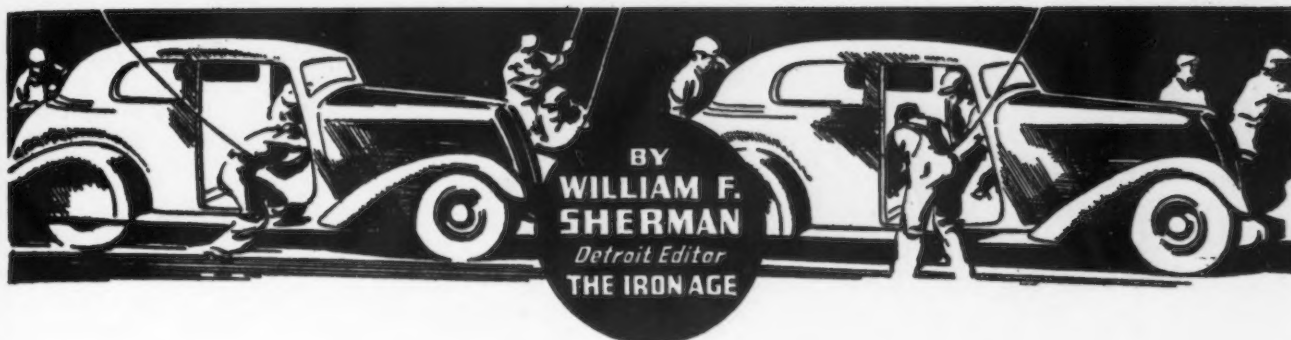
With the exception of peaceful picketing near the Newton Steel Co. plant at Monroe, there is at the moment nothing savoring of an actual break or strike against any large concern in the State. Ternstedt, the last General Motors divi-

sion to experience trouble, saw its 12,000 men back at their machines the middle of last week. Workers at the Chevrolet gray iron foundry, Saginaw, went back to work Wednesday and the opening of Chevrolet plants in Flint followed. Nash-Kelvinator Corp., where 400 had sat down to get recognition and pay increases for office workers, opened its doors this morning to returning workers.

After hesitating a long while, Homer Martin, president of the United Automobile Workers, has finally decided that the union's apparent lack of control over its members is more disadvantageous to it than the possible expulsion of some of its hotheads could be. Fri-

day he met with the general executive board of 12 men, then issued a threat to act at once against any organizer or union man who brought about a strike in violation of the International Union Constitution, which requires a two-thirds vote of the members and the consent of the international officers to call a strike. However, it is generally believed that Mr. Martin will not be called upon to prove that he means what he says. Layoffs and shutdowns for seasonal changes are throwing enough scare into the factory workers to ward off any trouble that might be brewing. Men faced with a couple of weeks' layoff will not be anxious to stop work voluntarily. Ford, for instance, is already on a four-day week and a company source admits that a general shutdown is expected about July 19. Even the office workers at Ford's are feeling the tension, and it is reported that they have been deprived of their vacations. Briggs worked only four days last week and both Briggs and Chrysler were reported to be laying off 25 per cent of their forces.

With this comparative peace, there should be time to review the last half year and establish, if possible, some policies that will permit the automobile industry to operate uninterrupted when the expanded plants get going on the production of the next models. Some look to Washington and to the intervention in the steel strike as the next logical step. Now that the Administration has been drawn into the labor argument, they see a chance to get the Government to assume responsibility for maintaining peace through some kind of board more effective than the National Labor Relations group, which will function only at the request



of unions. The automobile manufacturer regards the recent situation here as just as much of a national emergency as the tie-up that threatens steel.

#### Labor Candidate for Mayor

Serious thought also is being given the most recent action of the CIO and the AFL in Detroit. Indicative of the national possibilities is the fact that these two groups have sunk their differences sufficiently to unite behind a labor slate for mayor and council in the forthcoming City elections. In a contest that nominally is nonpartisan, the unions have set up a distinct labor slate, acting at a secret meeting at the headquarters of the Detroit and Wayne County Federation of Labor. Only one on the slate of potential labor candidates had previously announced that he would seek office. He is Patrick H. O'Brien, former Democratic attorney-general of Michigan, seeking the mayoralty. Those named for the council were Richard T. Frankenstein, Detroit organizational director for the United Automobile Workers' union; Walter Reuther, president, West Side Local UAW; R. J. Thomas, president, Chrysler local; Tracy N. Doll, president, Hudson local; Frank X. Martel, president, Detroit and Wayne County Federation of Labor; Ed Thal, chairman, Building Trades Council, AFL. This partial slate (Detroit has a nine-man council) gives the UAW four of the six places on the theory that its membership far surpasses that of the AFL locals. The UAW claims 175,000 members in Detroit.

Among the labor planks ratified as a platform for these candidates were:

1. Legislation to fix residential

rentals at 1 per cent per month of assessed valuation.

2. Reorganization of the police department on the basis that "police are hired for the protection of people, not for strike-breaking, evictions and intimidation."

3. A more extensive educational program and elimination of overcrowded school rooms.

4. Representation of labor on all city commissions.

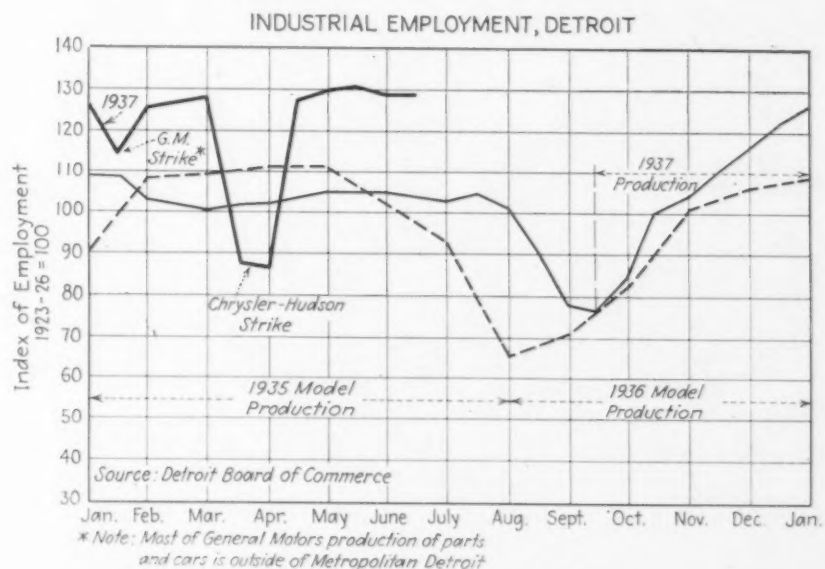
At labor's political pow wow, plans were announced for a huge Labor Day celebration in Detroit, with a parade in which "200,000 will be expected to march and will be penalized in some manner if they do not." No Labor Day parade has been held in Detroit since 1916.

This ambitious program is direct confirmation of the warning that has been heard frequently from

serious observers of the CIO. John L. Lewis' organization, it has been said often, is not content to fill the place of an ordinary labor union. Instead, it intends to follow a plan of direct political action, to name its slates and to use its membership to put union officers into municipal posts "to dominate legislation and over-ride the mayor's veto, if necessary," members of the CIO-AFL political committee asserts.

#### Plans for New Plants

Harassed as it is, the automobile industry goes ahead with further plans for expansion. Apparently not at all fearful of the labor situation locally, the Chrysler Corp. is about to put up a new assembly plant about three miles from its Highland Park central offices. Planned originally by Plymouth, the project is now sponsored by another part of the corporation and



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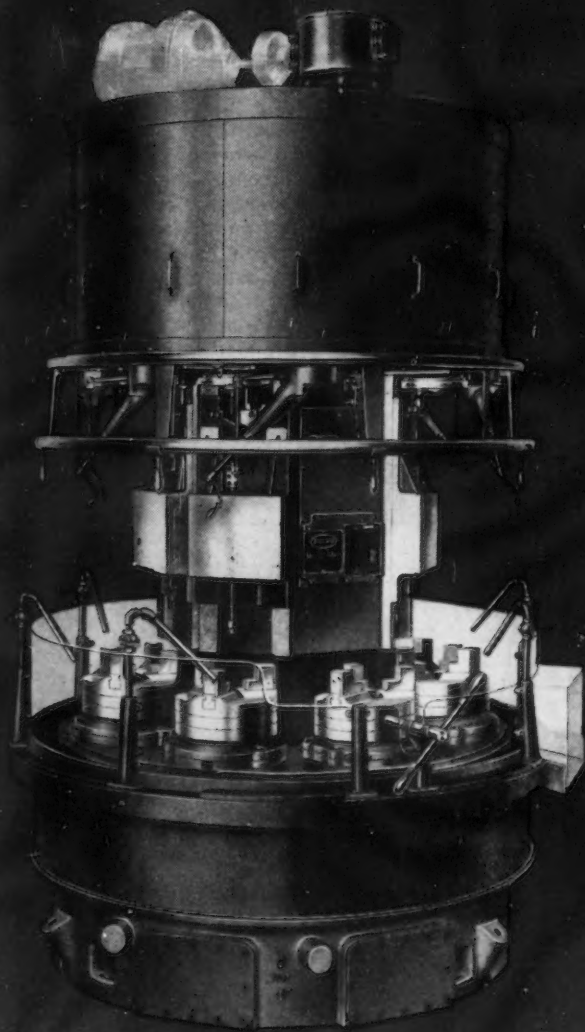
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it is possible that a new line of trucks will be driving off assembly lines there before many months have passed. July, it is understood, is the deadline on the options that Chrysler holds on some 60 acres northeast of the city. This leaves wide open for conjecture the proposition that Plymouth still may be interested in putting up another assembly plant in Detroit.

General Motors in the last week announced another major plant, which will cost \$15,000,000. Ternstedt Manufacturing Division, now occupying a large group of plants in Detroit, will erect a building at Trenton, N. J. About 900,000 sq. ft. of floor in a one-story monitor type building will be provided with a two-story office structure on the front and two stories extending along the side to be used for finishing processes. Ternstedt produces automobile body hardware, using a large quantity of small machine tools, punch presses, die casting machines, plating equipment, grading equipment, enamel baking ovens and small production machinery. The new plant will employ approximately 3000 persons, a large percentage of them women. Also included in General Motors' expansion is an addition to the Grand Rapids Stamping Division and rearrangement of the stamping plant at Cleveland. Already announced is the construction of a new press shop at Fisher Body No. 1, Flint. Incidentally, the Grand Rapids plant, housed in a beautifully equipped new building late last year, was operating 50 per cent above its planned capacity this spring, so the new facilities undoubtedly are needed.

Firestone Steel Products Co. has purchased 80 acres in Riverview, down river from Detroit, and will

erect immediately a 300 x 700 ft. plant to manufacture tire rims and other similar metal products. The building plans, incidentally, call for a structure more than four times as big as that indicated above and it is not unlikely that the erection of a complete structure 1000 x 1100 ft. will be ordered soon and the manufacture of tires as well as metal products is a possibility. At Jackson, Mich., the Goodyear Tire & Rubber Co. started production June 1, manufacturing its first tires experimentally. On July 1, at Cadillac, Mich., B. F. Goodrich Co. will open its new mechanical rubber goods plant, to produce about half a million pounds of rubber goods a month, most of it to be used in automobiles.

#### Production Lower

Automobile production showed a new drop last week, with labor troubles in the first part of the week hampering production schedules severely. According to Ward's Automotive Reports, the drop was rather slight, however, the estimated figure being 111,620 units in the United States and Canada, compared with 118,798 last week and 100,161 in the corresponding period last year. General Motors, with its Saginaw foundry and Chevrolet plants tied up, suffered most severely. Nash Motors lost one day's production due to a strike. Dodge Truck Division lost a day because a supplier's plant was closed by a strike. Chrysler gained a few hundred, from 28,100 to 28,875. Ford was unchanged at about 29,665. The General Motors figures dropped from 45,063 to 36,450. General Motors has been aiming at 50,000 or more because it has thousands of unfilled orders, although sales demand for automo-

biles in general is reported as becoming spotty.

## Japan's Iron, Steel Imports Not Gaining

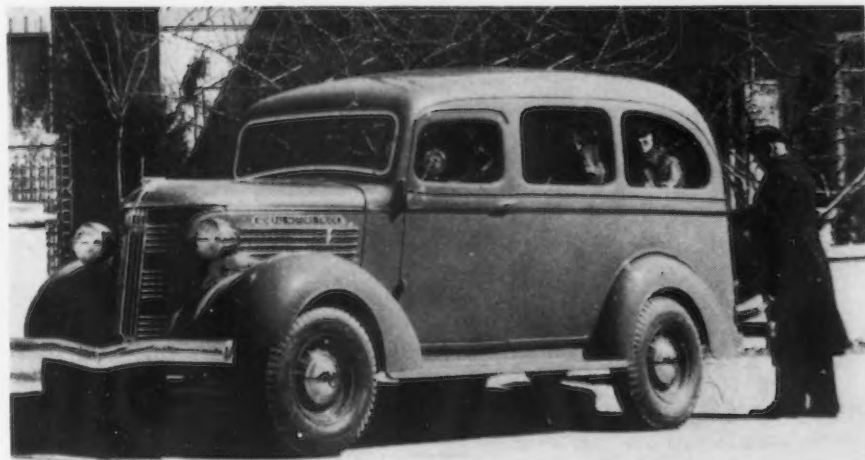
JAPANESE imports of iron and steel products during March aggregated 196,909 metric tons and, although an increase of 3687 tons over February was recorded, imports were practically identical with the trade in March, 1936, American Trade Commissioner Paul P. Steintorf, Tokyo, reported to the Bureau of Foreign and Domestic Commerce.

This was the second consecutive month in which imports have fallen below expectations. The reason is said to be attributed mainly to the almost complete stoppage of pig iron imports from Soviet Russia.

American participation in the Japanese import trade during March was at its lowest monthly level for the past three years. On a quantity basis the United States supplied 31 per cent of the total, exclusive of pig iron, in which the share was 27 per cent, according to the report.

Simplified Practice Recommendation 115-30 covering full disk buffing wheels has again been reaffirmed without change by the standing committee of the industry, according to the Division of Simplified Practice of the Bureau of Standards. Printed copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5c. each. A discount of 25 per cent will be allowed on orders for 100 or more copies.

**F**ROM wood to steel. There has been a sharp trend in the last nine months away from the old wooden suburban station wagon. Steel bodies are now being used by several automobile manufacturers for this type of car. Panel body top dies and many of the shop fixtures such as welding jigs, can be used both for the delivery wagon and this small production unit, which is intended primarily for such service as station-to-estate or hotel-to-airport, or as a combined commercial vehicle and family passenger car. The restyling of this type of vehicle and the adoption of all-steel bodies has caused a spurt in production.



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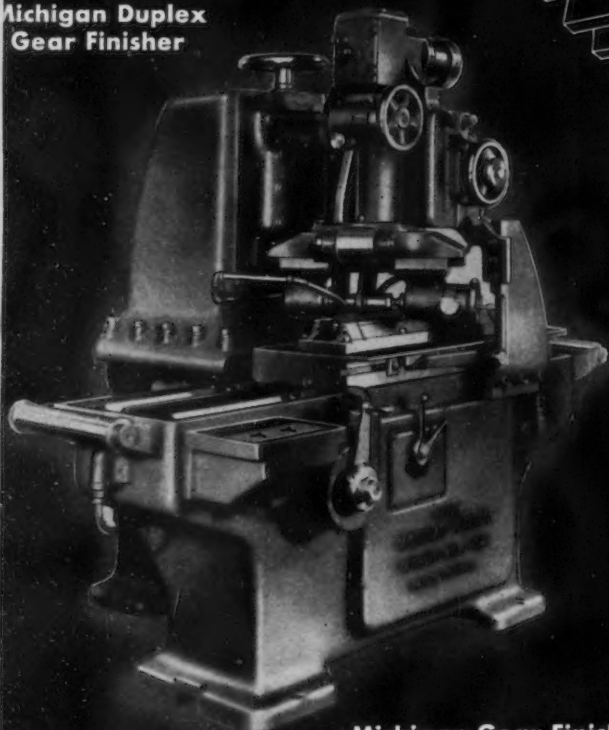
Internal Gear Finisher



Michigan Duplex Gear Finisher



Hob Contour Checking Fixture



Michigan Gear Finisher



Hob and Worm Lead Checker



Tooth Form and Spacing Checker



# to FINISHED GEAR

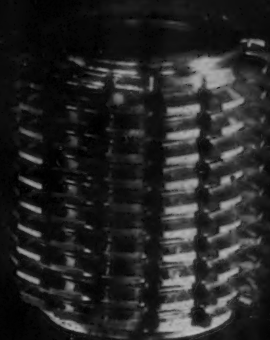
## Milestones and Achievements

1. "Crossed Axes" shaving for gear finishing introduced by M. T. C. (Facilitated adoption of helical gears).
  2. Modern production methods for internal gears pioneered by M. T. C.
  3. Even more MITCO hobs and shaper cutters used today than ever before.
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  7. MICHIGAN gear production equipment adopted not only by virtually every major domestic producer but by many foreign manufacturers.
  8. Consulting service on gear production-engineering made available to industry without charge.
  9. Checking equipment expanded to include every type of instrument necessary for production and laboratory checking of gears.
  10. New "Duplex" finisher for machining several gears of a cluster simultaneously, introduced.
  11. Assisted in the development of broaching methods for gear cutting.
- Etc. etc.

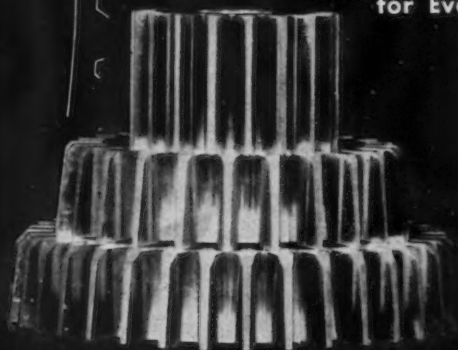
**MICHIGAN TOOL COMPANY**

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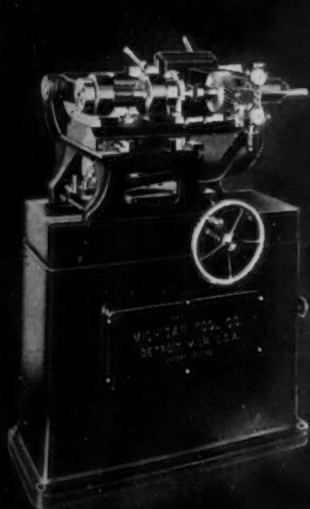
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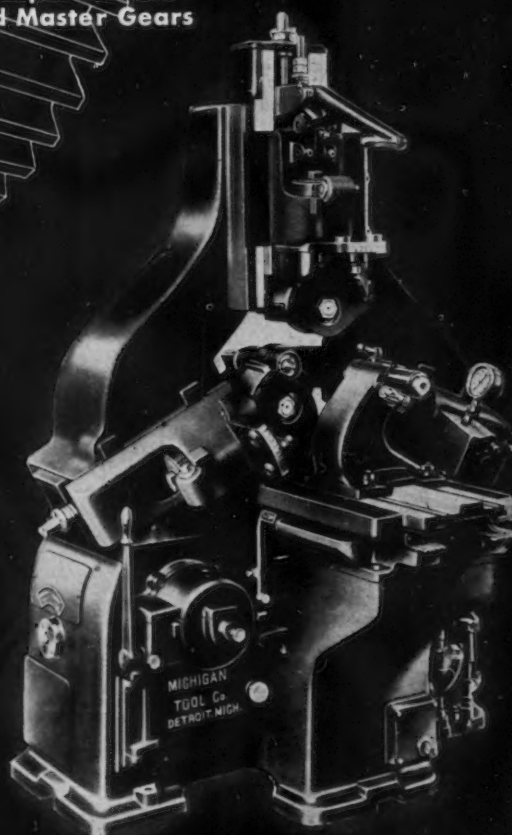
Shaper Cutters  
and Master Gears



Spiral Lead Checker



Gear Speeder for  
Production Checking



Michigan Gear Lapper

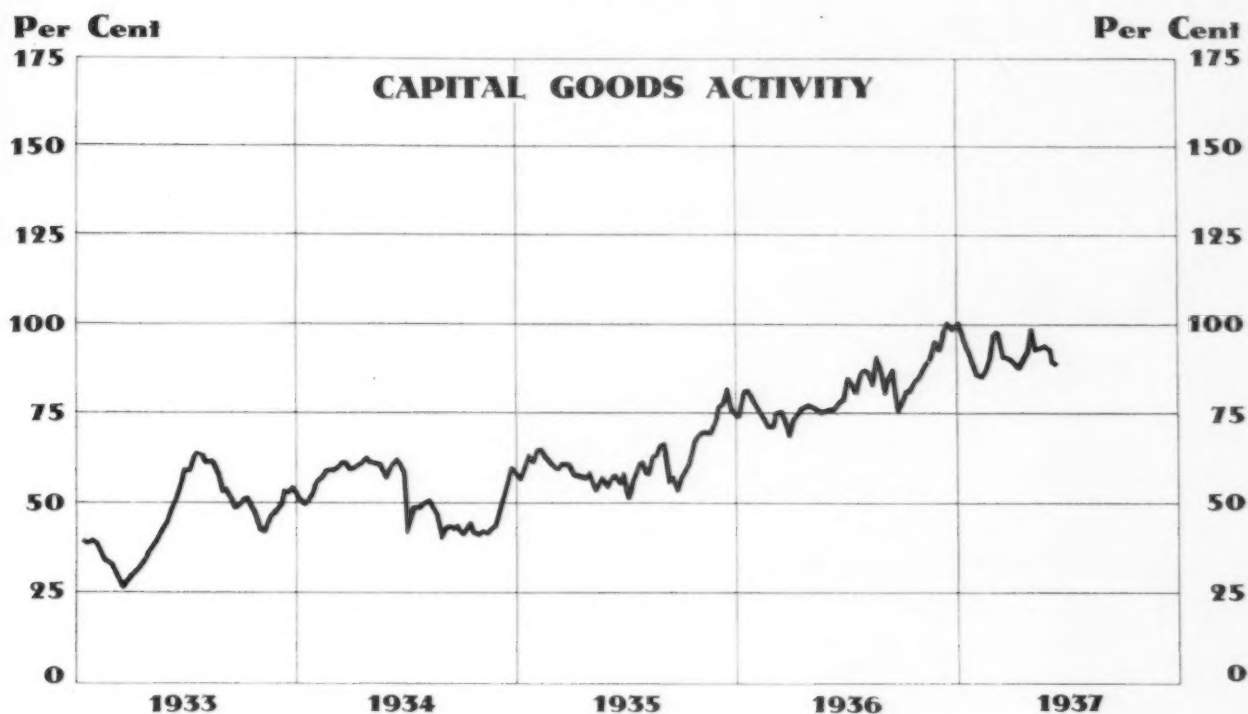


# Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Boldface Type Indicates Changes This Week.

	May, 1937	April, 1937	May, 1936	Five Months, 1936	Five Months, 1937
<b>Raw Materials:</b>					
Lake ore consumption (gross tons) <sup>a</sup>		5,114,177	3,485,293	15,452,327	
Coke production (net tons) <sup>b</sup>		4,655,226	3,837,323	17,502,489	
<b>Pig iron:</b>					
Pig iron output—monthly (gross tons) <sup>c</sup>	3,537,231	\$3,391,665	2,648,401	10,887,986	16,599,087
Pig iron output—daily (gross tons) <sup>c</sup>	114,104	\$113,055	85,432	71,631	109,928
<b>Castings:</b>					
Malleable castings—production (net tons) <sup>d</sup>		63,377	45,027	230,326	
Malleable castings—orders (net tons) <sup>d</sup>		62,940	44,136	222,207	
Steel castings—production (net tons) <sup>d</sup>		104,463	64,246	271,259	
Steel castings—orders (net tons) <sup>d</sup>		99,632	63,950	329,199	
<b>Steel Ingots:</b>					
Steel ingot production—monthly (gross tons) <sup>e</sup>	5,135,559	5,071,875	4,037,375	17,300,528	24,580,871
Steel ingot production—weekly average (gross tons) <sup>e</sup>	1,163,332	1,182,255	911,371	796,525	1,139,058
Steel ingot production—per cent of capacity <sup>e</sup>	88.82	90.27	69.6	60.78	87.1
<b>Finished steel:</b>					
Trackwork shipments (net tons) <sup>f</sup>	8,807	9,888	7,314	28,085	44,814
Sheet steel sales (net tons) <sup>f</sup>			191,511	946,647	
Sheet steel production (net tons) <sup>f</sup>			224,056	1,064,210	
Fabricated shape orders (net tons) <sup>g</sup>		148,152	145,553	612,249	
Fabricated shape shipments (net tons) <sup>g</sup>		136,042	134,623	516,768	
Fabricated plate orders (net tons) <sup>g</sup>		38,769	49,285	175,511	
U. S. Steel Corp. shipments (tons) <sup>h</sup>	1,304,039	1,343,644	984,097	4,145,285	6,345,724
Ohio River steel shipments (net tons) <sup>i</sup>	102,200	101,720	86,004	356,166	510,590
<b>Fabricated Products:</b>					
Automobile production, U. S. and Canada <sup>k</sup>		553,415	480,571	2,125,422	
Construction contracts, 37 Eastern States <sup>l</sup>	\$244,112,800	\$270,125,200	\$216,070,700	\$1,004,676,100	\$1,176,377,200
Steel barrel shipments (number) <sup>d</sup>		970,749	721,021	3,143,629	
Steel furniture shipments (dollars) <sup>d</sup>		\$2,462,687	\$1,451,199	\$7,741,223	
Steel boiler orders (sq. ft.) <sup>d</sup>		674,248	723,343	3,530,731	
Locomotive orders (number) <sup>m</sup>	14	84	10	98	206
Freight car orders (number) <sup>m</sup>	3,903	13,046	9,677	22,234	44,562
Machine tool index <sup>n</sup>	208.5	282.5	118.9	†116.6	†234.2
Foundry equipment index <sup>o</sup>	237.6	208.1	165.4	†138.1	†248.1
<b>Foreign Trade:</b>					
Total iron and steel imports (gross tons) <sup>p</sup>		68,197	59,391	259,235	
Imports of pig iron (gross tons) <sup>p</sup>		11,469	15,296	80,714	
Imports of all rolled steel (gross tons) <sup>p</sup>		39,239	20,994	108,053	
Total iron and steel exports (gross tons) <sup>p</sup>		671,746	314,950	1,336,640	
Exports of all rolled steel (gross tons) <sup>p</sup>		197,327	93,686	432,927	
Exports of finished steel (gross tons) <sup>p</sup>		174,143	86,346	399,780	
Exports of scrap (gross tons) <sup>p</sup>		421,383	217,439	885,762	
<b>British Production</b>					
British pig iron production (gross tons) <sup>r</sup>	696,300	680,700	661,000	3,105,000	3,311,700
British steel ingot production (gross tons) <sup>r</sup>	1,047,300	1,080,400	963,000	4,778,300	5,232,000
<b>Non-ferrous Metals:</b>					
Lead production (net tons) <sup>s</sup>		43,908	41,551	185,197	
Lead shipments (net tons) <sup>s</sup>		55,200	33,125	178,001	
Zinc production (net tons) <sup>t</sup>	55,012	\$52,099	44,905	208,785	230,064
Zinc shipments (net tons) <sup>t</sup>	55,201	56,229	43,977	210,833	269,245
Deliveries of tin (gross tons) <sup>v</sup>		6,995	5,235	29,225	
Copper production, refined (net tons) <sup>w</sup>	95,265	83,178	59,374	748,660	401,449

\* Preliminary. † Three months' average. ‡ Revised.  
Source of figures: <sup>a</sup> Lake Superior Iron Ore Association; <sup>b</sup> Bureau of Mines; <sup>c</sup> THE IRON AGE; <sup>d</sup> Bureau of the Census; <sup>e</sup> American Iron and Steel Institute; <sup>f</sup> National Association of Flat-Rolled Steel Manufacturers; <sup>g</sup> American Institute of Steel Construction; <sup>h</sup> United States Steel Corp.; <sup>i</sup> United States Engineer, Pittsburgh; <sup>j</sup> When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census; <sup>k</sup> F. W. Dodge Corp.; <sup>l</sup> Railway Age; <sup>m</sup> National Machine Tool Builders Association; <sup>n</sup> Foundry Equipment Manufacturers Association; <sup>o</sup> Department of Commerce; <sup>p</sup> British Iron and Steel Federation; <sup>q</sup> American Bureau of Metal Statistics; <sup>r</sup> American Zinc Institute, Inc.; <sup>s</sup> New York Commodities Exchange; <sup>t</sup> Copper Institute.



The Iron Age Weekly Index Numbers of Capital Goods Activity  
(1925-27 = 100)

Last week .....	88.6	Same week 1933 .....	54.9
Preceding week .....	87.9*	Same week 1932 .....	36.9
Same week last month .....	93.7	Same week 1931 .....	64.4
Same week 1936 .....	77.7	Same week 1930 .....	97.5
Same week 1935 .....	55.6	Same week 1929 .....	129.0
Same week 1934 .....	60.8		

\* Revised.

**A**CTIVITY in the production and distribution of durable goods gained fractionally from the revised figure of the preceding week, according to THE IRON AGE seasonally adjusted index. A slight change in the figure for the week ended June 12 was made as a result of a revision in the production index in the Pittsburgh area. Although automotive production for the week ended June 19 fell off 6 per cent, largely because of labor difficulties in General Motors parts plants, and steel production was down a point, offsetting gains in car loadings of forest products and an increase in heavy construction dollar volume of 87 per cent over the preceding week enabled the composite index to advance 0.7 points, turning the curve upward for the

first time since May 1. Construction awards reached the highest point since Jan. 9, 1936, the principal gain being recorded in private contracts which rose 179 per cent above the preceding week. The rise in the Pittsburgh index is accounted for chiefly because of a gain in originating shipments.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity) .....	77.0	-1.0
Automobile production (number of cars and trucks) .....	111,620	-7,178
Railroad loadings of forest products (number of cars) ..	39,480	+1,843
Pittsburgh industrial production and shipments (index number)	105.2	+0.6
Construction contracts awarded (total value) .....	\$80,380,000	+\$37,547,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District, from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

# WASHINGTON . . . . .



By L. W. MOFFETT

Resident Washington Editor,  
The Iron Age

... *Steel Mediation Board appointed by Secretary Perkins openly criticised as having "predilections" on strike issue.*

... *Various witnesses including CIO leader Philip Murray, examined by Senate committee in investigation of mail tampering by strikers.*

... *Coal operators warn John L. Lewis they will not submit to breaking of United Mine Workers contract by refusing to ship coal to strike-affected steel companies.*

WASHINGTON, June 22.—Marking the first direct intervention by the Federal Government in any of the widespread labor controversies, the appointment last Wednesday by Secretary of Labor Frances Perkins of the Federal Steel Mediation Board, on instructions from President Roosevelt, has given eager hope to the Administration that it has found a solution that will lead to a settlement of a situation that is sorely harassing to it.

Passing by the National Labor Relations Board probably to keep the Administration itself out of the controversy and apparently because so strongly pro-union, it was considered a futile agency to bring peace between independent steel companies and John L. Lewis' Committee for Industrial Organization, the Administration turned to a three-man mediation board after Governor Davey of Ohio, unsuccessful in efforts to settle strikes in that state, urgently requested Federal aid, a demand that had been consistently made by union leaders. The union demand has been widely interpreted as seeking Government support to brace up a losing cause, though this is hotly denied by the Steel Workers Organization Committee, CIO affiliate.

The Steel Mediation Board consists of Charles P. Taft, II, Cincinnati, son of William Howard Taft, former President and former Chief Justice; Lloyd K. Garrison,

dean of the University of Wisconsin and first chairman of the former National Labor Board and Assistant Secretary of Labor Edward F. McGrady and former American Federation of Labor official, now known as the Administration's "trouble shooter." The board headquarters is in Cleveland.

## The Board's Predilections

Though the board consists of these high grade men, there has developed skepticism regarding its efforts to bring about an agreement. While peace is earnestly desired, nevertheless a common view was reflected by Senator Vandenberg, Republican of Michigan, who said the board starts "under the handicap of not only one-sided Presidential opinion respecting the issue but also with one-sided predilections of their own."

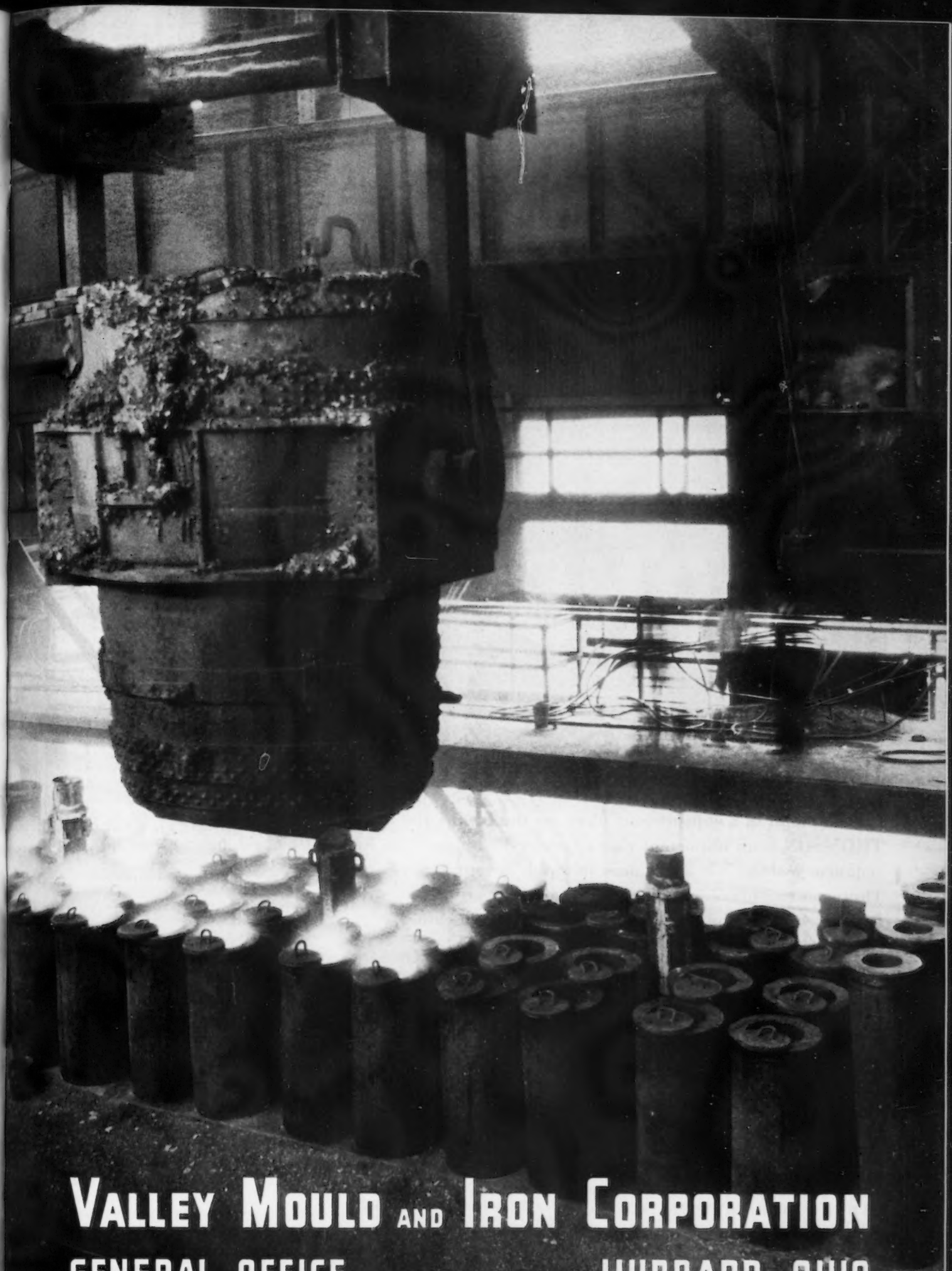
This appraisal of the board has been criticized as being premature and unfair. The point has been made that the board may rise above the "predilections" which are credited to it. The board was set up under the act creating the Department of Labor and under the law is an independent agency. Acting in that capacity, it has the power to make recommendations without regard to the "predilections" of any source. It does not have to reflect Administration sympathy, as some critics have said it might be inclined to do, with the union demand for signed contracts. The board

has been described also as representing industry through Chairman Taft; organized labor through Mr. McGrady and the public through Mr. Garrison.

Despite confidence expressed by Administration officials that the board will quickly bring about peace, apprehension is felt that it has a most difficult job. This is based on the central point of dispute relating to the matter of signed contracts, insisted upon by CIO and resisted by the steel companies. The belief prevails that the steel companies will continue to hold out against signing contracts at least unless the CIO, through its affiliate, SWOC, accepts conditions such as an agreement, with Government guarantee of performance of contract, not to demand a closed shop or the checkoff. Union opposition to the effort of steel companies to reopen strike-affected plants during the board's negotiations is another major stumbling block before the board. In the past during labor negotiations involving CIO unions strike-affected plants have been kept closed.

And the country in this period of amazing spectacles has just seen the most amazing spectacle of Governor Earle of Pennsylvania threatening to call out the National Guard to close a strike-besieged steel plant—the Cambria plant of the Bethlehem Steel Co. at Johnstown, Pa.—in the face of vigorous protest by President Eugene G.





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Grace of Bethlehem and Mayor Daniel H. Shields of Johnstown. The mayor's appeal to President Roosevelt to "end this reign of terror" met with a statement, well founded on constitutional grounds, that the President had no legal authority to act unless called upon for aid by the Governor of Pennsylvania.

Inasmuch as the Steel Mediation Board's purpose is to encompass the entire steel strike situation, the hope has been expressed that it would prevent further tenseness and violence at Johnstown as well as at other points.

Regarding the "predilections" of the members of the board, both their actions and writings have been cited, most often to prove a union labor bias. On the other

hand, it has been pointed out, each has done and said things that rubbed organized labor the wrong way. Mr. Taft, prominent lawyer, and part owner of the Cincinnati *Times-Star*, has been alluded to as a "sensible liberal." He served alongside the late Samuel Gompers, long the head of the American Federation of Labor, on the National War Labor Board and the two were generally in agreement on decisions. Mr. Taft mediated the automotive strike in Toledo, Ohio, in 1934. He was adviser to Governor Landon during the presidential campaign. While generally—not uniformly—approving of New Deal labor legislation, he has frequently been a strong critic of New Deal economic policies.

To indicate his social thought,

the following quotation from Mr. Taft has been published widely since his appointment to the chairmanship of the Steel Mediation Board:

"The first lien upon the gross earnings of any company is a living wage for its employees. The idea of a real and legal partnership between workers and other elements in the company is, it seems to me, the only alternative to the bitterness of class struggle in our industrial order. For partnership is democracy, and is the only way to social peace in industry."

#### Old Board Ruled That Signed Agreements Are Compulsory

Mr. Garrison was the first chairman of the former National Labor Board, and was serving in that capacity when in the Houde Engineering Co. case it adopted the "majority rule" principle, now written into the constitutionalized Wagner Act. In the Houde decision also was the declaration that signed agreements are compulsory, an issue which involves the very heart of the steel controversy. But when it is said that Mr. Garrison reflects the union view on this subject answer is made that he has vigorously attacked the sit-down strike, a CIO technique, as being illegal beyond any question. The observation may be made, however, that sit-down strikes are not an issue in the present controversy.

Mr. McGrady not only is a strong supporter of organized labor, in the ranks of which he was long a high official, but he has frequently assailed labor policies of industrialists. But here also it can be said that Mr. McGrady has drawn the fire of organized labor for the attitude he has taken at times as mediator in many labor disputes. It is said that his independence has on occasion irritated his superior, Miss Perkins, who is held to have decidedly pro-CIO proclivities. Industrialists who have dealt with him have expressed genuine respect for Mr. McGrady. They have said he has been fair and that no signed agreement is necessary to assure Mr. McGrady's living up to his word.

He has said that the Government needs a real national labor policy in the interest of both labor and management.

"Either by legislation or by industrial agreements we must put an end to this curse of constant economic warfare," McGrady has said. "If it is not done voluntarily for the good of industry, labor and the people and for the safety of the entire nation, it will be done by another method."



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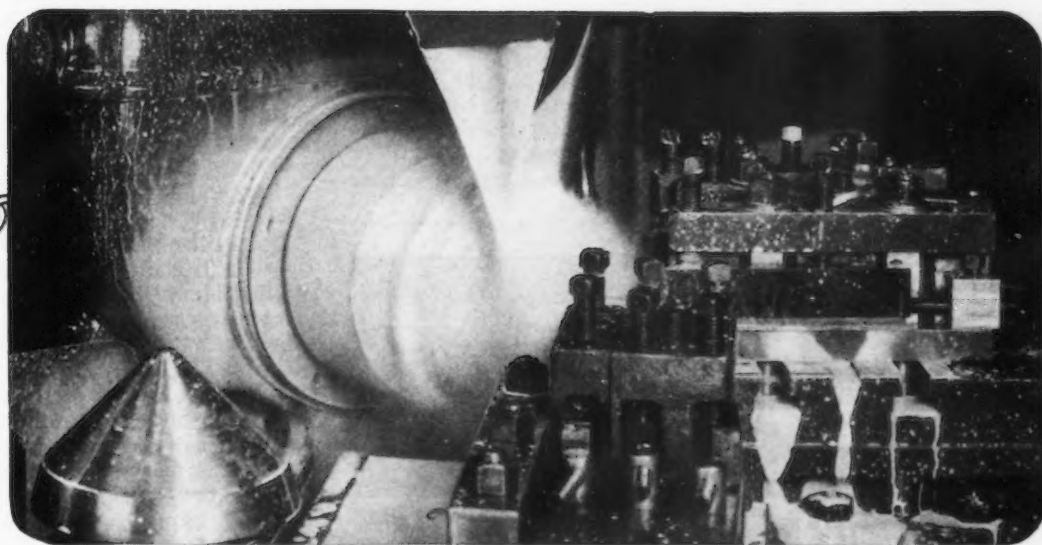
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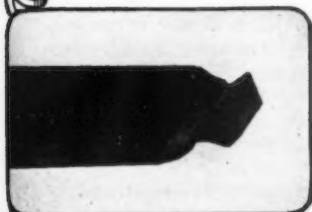


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## Senate Committee Hears Testimony on Tampering With Mails by CIO Pickets

WASHINGTON, June 22.—Airing of charges of mail censorship and interference by strikers at the Warren and Niles, Ohio, plants of the Republic Steel Corp. before the Senate Committee on Postoffices and Post Roads has developed sharp clashes,

notably through pointed questions directed at Philip Murray, chairman of the Steel Workers Organization Committee, by Senator Bailey, Democrat of North Carolina, and Senator Ellender, Democrat of Louisiana.

Murray, the first witness as hear-

ing opened Thursday, sought to shake off SWOC responsibility, and was frequently maneuvered into tight positions from which he tried unsuccessfully to escape by attempting to divert the committee, his chief technique being to attack steel companies.

The steel company charge of striker interference with the mails was stoutly set forth, the opening gun being fired by Lewis L. Guar-niere, Warren attorney for Republic.

Mr. Guar-niere presented specific testimony to sustain contentions that delivery of food and clothing by U. S. mail to the Warren and Niles plants has met with picket interference and, moreover, that strikers were permitted to censor the mail.

Denials of SWOC representatives and postal authorities of striker mail censorship came in the face of striker admission of censorship in the form of a telegram from SWOC members. Denial of mail interference was based on the thin plea that only in one instance have strikers attempted to interfere with "normal mail."

The Republic company has instituted court proceedings against the Postmaster General, demanding that he withdraw unofficial promulgation with respect to "irregular mail" and to instruct the postmasters at Warren and Niles to accept parcel post packages for delivery at company plants in those cities.

On the House side the Committee on Postoffices and Post Roads, accepting a statement of W. W. Howes, Acting Postmaster General, similar to statements he made before the Senate committee, killed a resolution for a House investigation of charges of mail interference by steel strikers. Howes reiterated the Postoffice Department ruling against delivering mail to "dangerous areas."

### Senate Inquiry to be Broad

The Senate inquiry promises to be broad, though there is a move to bring it to an early end. Not only are witnesses to be summoned from the affected Ohio areas but, responding to organized labor demands, the committee voted to widen the front by reaching out to the Chicago area to summon police and other public authorities who were called out on the occasion of a strike riot on Memorial Day near the Republic plant in South Chicago. The committee also voted to subpoena the motion picture of the demonstration. This much union-ballyhooed film, having been "built up" as showing such police terrorism that Government

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officials had "suppressed" its public exhibition lest it "incite the public" is to be made public "at the proper time" by the Senate Civil Liberties League, Senator LaFollette announced. Perhaps the public will realize that a film by omissions can present a distorted picture.

Committee members also want high steel executives to appear before it. This desire has been expressed by Senator Bailey, whose questioning of witnesses seems to justify his claim that he represents "both workers and employers." Senators who are admittedly hostile to the steel executives also want to question them.

Following a motion by Senator Rush D. Holt, Democrat of West Virginia, asking SWOC for figures on receipts and expenditures covering its organization drive, the committee voted to request similar information from the steel interests. Holt is a bitter critic of John L. Lewis.

Murray was repeatedly interrupted by Senator Bailey in the presentation of his 16-page prepared statement.

Bailey was severely critical of Murray's insistence of a written contract in the current dispute with the independents.

"Senator," Murray answered, "I think you are biased. I represent the workers and you the employers."

"I represent both sides," Bailey retorted.

Parts of Murray's statement which provoked the remarks from the North Carolinian were largely a reiteration of his group's attitude in the strike situation.

#### Denies Stopping Mails

Conclusive evidence to the contrary, Murray said charges that pickets have stopped the mails and opened packages are absolutely unfounded. As if their "feeling" in the matter should determine a code of postal regulations he declared that, while strike pickets felt from the beginning that use of the mails to feed and clothe strike breakers was completely unwarranted, no attempt was made by the strikers to interfere with its delivery.

In the course of other careless statements, Murray charged Sheriff Elsner of Mahoning County, Ohio, and his deputies were "hired thugs" paid by Republic and met with a sharp denial from the sheriff. In a telegram to Senator Bridges, the sheriff offered to appear before the committee. Senator Bridges said the sheriff would be summoned. Elsner, in his telegram, said his deputies are long-time residents and mostly residents of Mahoning

County from which they receive their pay. Further union fire at Republic was let loose when Lee Pressman, CIO counsel, filed charges with the National Labor Relations Board alleging violation of the act by discharging employees and by a lockout at Republic's Canton, Ohio, plant last year and with "maintenance of extensive arsenals, including machine guns, rifles, revolvers, tear and bombing gas." The board, of course, said it would investigate the charges. As a follow-up CIO also has asked Sec-

retary of Treasury Morgenthau to investigate charges of violation of the National Firearms Act by Republic and Sheet & Tube.

Guarniere related to the Senate committee the incident leading to his discovery that postoffice officials in both towns were refusing mail containing food and clothing and testified that posting the articles was resorted to only after pickets outside the plants had stopped all truck and railroad deliveries. He said his company had been unable to ship supplies in by railroad since

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pickets had blocked the the path of the trains by "standing on the tracks, manipulating switches and dynamiting the rails."

#### Pickets Opened Packages

Even a special delivery messenger was waylaid and the contents of a package opened and inspected by one of the strikers, he said. That package was later delivered to the plant, Guarniere told the committee when the acting postmaster at Warren learned of the incident and ordered its delivery irrespective of contents.

Guarniere described another instance where medicine had been mailed to the plant. It was opened and inspected by the postoffice, he related, and was allowed to pass after Galloway and Payne were

consulted and agreed to its delivery.

"After you failed to deliver supplies to the plants by all other methods of transportation, don't you think it was expecting the impossible to ask the postal authorities to take the responsibility of delivering it for you?" asked Chairman McKellar, Democrat of Tennessee, who clearly is supporting the Postoffice Department view.

"I assumed," Guarniere replied, "that the authority of the Postoffice Department was far greater than the power of any individual or company."

"It seems to me that an attempt has been made by both the strikers and the companies to get the support of the Postoffice Department,"

McKellar continued, "and the department has refused to take either side."

As Guarniere recalled his first attempt to mail four packages of food in Niles, McKellar, following up the charges of Murray that the incident was a publicity stunt, asked if pictures of the mailing incident had not been taken at the request of the company. Guarniere denied this.

McKellar sought, too, to learn if complaint of the alleged mail interference, such as the special delivery incident, had been referred to the district attorney for action. Guarniere said he believed such action was to be taken.

The situation obtaining in both Niles and Warren, Guarniere testified, is that letters are reaching the plants. Food and clothing are not, he said.

#### Payne and Galloway Send "Regrets"

Murray submitted affidavits from Payne and Galloway, who regretted their inability to appear before the committee because of "the urgent need of their presence on the picket line in Niles." Despite this naive effort to escape grilling, Payne and Galloway, of course, are subject to subpoena. After Friday's session, Senator Bridges, Republican of New Hampshire, who sponsored a resolution for investigation of mail interference charges, said that Payne and Galloway might be summoned.

The appearance before the committee of Eugene G. Grace, president of Bethlehem Steel Co. and Tom M. Girdler, chairman of Republic, was first suggested by Senator Bailey, who inferred he was not so much interested in the mail episode in this connection as he was to hear from them on the general strike situation and permit them to reply to charges made by Murray.

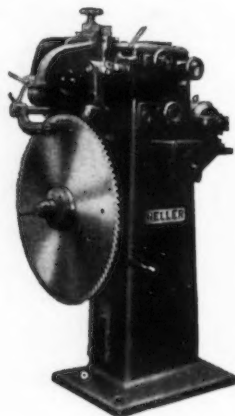
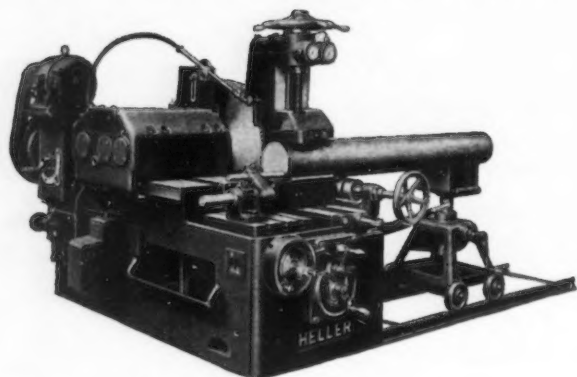
When in tilts with Senators, Murray, finding himself in a tight place, evaded by refusing to answer "hypothetical" questions. This was pointedly reflected in exchanges with Senator Ellender, Democrat of Louisiana. Ellender said he believed it could be proved that SWOC had forced employee unions of Republic, Bethlehem and Sheet & Tube to join the CIO affiliate. He asked whether Murray thought such a course was proper. Murray objected to the accuracy of the "premise." Ellender asked that Murray assume the facts for the sake of the question.

"I refuse to live in a world of assumption," Murray replied.

Ellender insisted on an answer.

"Are you an attorney for the

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steel corporations?" Murray shot back.

Ellender said he represented the poor man. He told Murray that he thought labor leaders had no right to call a strike causing bloodshed and violence merely because they wanted a written contract, provided the companies were meeting wage and hour standards. Murray replied that there was no assurance the standards would be met next week.

"Then I say strike next week, not now," Ellender loudly replied.

#### Republic Employees Testify

Three employees from Republic Steel plants substantiated the testimony given by Attorney Guarniere. R. H. Weaver, of Warren, an employee of the company's accounts and audits department was obviously irked by the line of questioning shot at him by Chairman McKellar. Even Senator Bailey and Bridges appeared amused as the chairman questioned the witness in detail as to a score of apparently unimportant features of his trip to

the postoffice with Attorney Guarniere.

Another employee, W. B. Thompson, of Lakewood, Ohio, who identified himself as an assistant purchasing agent, said he also accompanied Guarniere to the postoffice when packages of food and clothing were refused by the authorities, told the committee that no pressure was brought to bear by company officials at the time of mailing.

"Wasn't the purpose of your trip to the postoffice to see if you couldn't get the postal authorities to do what the company had been unable to do?" asked McKellar. "That is, to see that the mail reached the plant."

"I suppose so," was the answer. "Personally I didn't see any reason why they shouldn't be required to deliver it."

Senator Bailey remarked that the incident "was a test of the matter to develop facts. It was a matter of common sense. It resulted in a lawsuit against the Post Office Department."

Adding color to the session, James E. Musgrove, a pit recorder in the Republic plant at Warren, described how he was refused admission to the plant where he worked on the night shift, and then attempted to gain entrance by going miles out of the way through swamps and marshes. When discovered by pickets," he related, "I was first told to line up with another workman and the pickets proceeded to shoot. We ran."

In vivid language, Musgrove testified that pickets "tied my hands and threatened to hang me. They had plenty of rope and acted as though they meant business." Beaten with clubs and gas pipes, clothing torn to shreds, head and face covered with grease, was the way Musgrove described his condition after being caught by CIO pickets.

To substantiate his statement, the witness produced the overalls he wore on the occasion. Torn to shreds, discolored with grease, they obviously had been on the back of a victim who had received rough handling.

"Don't you think it would be a great honor to join a crowd like that?" asked Senator Bailey.

The witness gripped the edge of the table. "Yes, I do not," he snapped.

Musgrove said he had been an employee of the company for 12 years, adding that "everybody in the mill has been satisfied with the wages and hours."

Referring to the incident, Bailey

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retorted "somebody has got to be taught a lesson in America, haven't they?" The witness agreed.

#### Women Describe Mail Hold-up

The committee also heard testimony from the wives of two employees who had attempted to send clothing and other necessities of life to the plants. Mrs. E. C. McDonald, of Cleveland, described the contents of a parcel post package she tried desperately to get to her husband. Containing magazines and toothpaste, the package was refused at the postoffice in Cleveland. The witness said that only after a great deal of trouble was the package finally accepted. "I never realized before," she said, "that mailing a package in a United States postoffice could be made so difficult.

Mrs. Rhoda M. Best, a Youngstown housewife, told of the refusal of authorities there to accept mail containing supplies necessary for her husband's comfort. The postoffice clerks told her, she said, that "our orders from Washington are that no mail is to go into the mill." One package mailed couldn't even be recovered, she testified, because the "pickets had taken it off."

Stories of mail trucks being stopped by pickets in Cleveland while a "picket captain" looked over the mail and marked some for delivery and others for non-delivery were related by D. W. Jordan, an industrial engineer employed in one of Republic's plants in Cleveland. He told committee members that sawed-off shot guns, one or two high-powered rifles and other crude weapons had been discarded by pickets after picket posts had been raided by police outside of one plant.

Postmasters and letter carriers, too, were given an opportunity to be heard. John Wyndam, mail carrier of Warren, described his experiences in attempting to deliver mail through the picket lines. "They told me they'd beat my damn head off if I went any farther," Wyndam related. Consequently, the delivery was not made, he said, and no food and clothing have reached the plant since.

In response to questions from Senator Bailey, Wyndam said he had made a full report of the incident to his superiors. Ostensibly aroused by the testimony, Bailey turned to Howes.

"Have you made any effort to expedite action in these matters?" Bailey asked the acting Postmaster General.

"We are making our reports," was Howes' reply, "but we can't

dictate to the district attorney. We are taking care of the matter in the usual procedure and have ordered inspectors to the affected areas."

When the Niles postmaster, Harry A. Marceau, took the stand, committee members leaned forward eagerly to learn of the incident involving Galloway and Payne, who by their own admission, had "an agreement" with the postmaster at Niles.

Marceau vigorously denied there had been any agreement but testified that "when I learned the

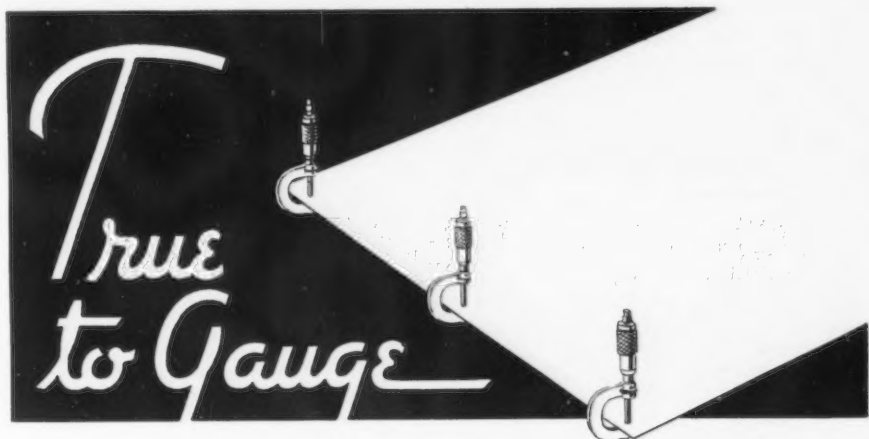
strikers were hostile toward certain classes of mail, I stopped delivery on that type of mail for the safety of the postal workers."

#### Postmaster Denies Agreements

"Indirectly, then, the pickets determined what packages were to be delivered?" asked Senator Bridges.

The postmaster vigorously denied this.

Bailey offered the suggestion that under those circumstances, "I think there was an agreement." Bailey also obtained from the



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Youngstown, Ohio





witness the admission that as far as the postoffice was concerned the workers in the plants might have starved.

"Don't you think that was taking sides in the controversy?" Bailey asked.

"No," was the reply.

M. B. Flaherty, assistant postmaster at Niles, likewise denied there had been any agreement with Payne and Galloway.

"But your refusal to accept food and clothing was agreeable to them?" queried Bailey.

Flaherty answered in the affirmative.

"It happened," Bailey continued, "that your policy was in accord with their demands." The witness agreed.

Bailey and Bridges seemed satisfied that if an agreement had not actually been made that the effects were precisely the same. McKellar showed his disapproval. Other committee members remained non-committal.

In connection with the affidavits filed by Galloway and Payne, in which they reported their inability to appear before the committee, examination of the papers disclosed that the two Ohio organizers explained to the committee that what they meant by their statement "we had an understanding" with postoffice officials at Niles, was that "we were given to understand by the officials what the ruling was."

## "Captive" Mines Come Under Coal Board

WASHINGTON, June 22.—The Bituminous Coal Board has interpreted the coal act's price-fixing and marketing provisions as applying to "captive coal" shipped between affiliated companies set up as separate corporate entities.

The board cited, for example, the shipment of coal to a steel corporation from a subsidiary mining company and ruled that the separate corporate entities cannot be ignored. Shipment of the coal, it said, actually results in a transfer of title and therefore cannot be exempted from the marketing and price-fixing provisions.

Although the term "captive coal" is not mentioned in the new coal act, Section 4-Part II (1) provides that "the provisions of this section (price-fixing and marketing) shall not apply to coal consumed by the producer or to coal transported by the producer to himself for consumption by him."

In view of this provision, "common sense" of which so much is heard, would seem to dictate that captive mines would not come within the jurisdiction of the Bituminous Coal Commission. But like other Government bodies it seeks to gorge itself with power and by far-fetched interpretations assumes authority that is not granted by law. The "interpretation" the Bituminous Coal Commission has

placed on the act as a means of grabbing jurisdiction over captive mines is eminently satisfactory to John L. Lewis' United Mine Workers Union. Which may explain the "interpretation."

Despite the board's failure to mention what effect the ruling would have on the taxing provision, it was pointed out by observers that under the interpretation "captive coal" would be taxable where shipment resulted in transfer of title as between separate corporate entities.

## 1936 Ore Production 60 Per Cent Over '35

MINING of iron ore in the United States in 1936 experienced the best year since 1930, according to a recent report of the United States Bureau of Mines. Production amounted to 48,788,745 gross tons, an increase of 60 per cent over 1935, but was still 25 per cent below the 1925-29 average. Hematite ores constituted the bulk of the output, accounting for 94 per cent of the total.

Shipments of ore in 1936, which increased 54 per cent over the previous year, amounted to 51,465,648 gross tons. The total value of shipments was \$131,740,594, equivalent to \$2.56 per ton.

Imports of iron ore amounted to 2,232,229 gross tons at an average price of \$2.37 per ton. These represented an increase of 50 per cent over 1935. Exports were slightly lower, amounting to 645,284 tons, compared with 660,553 tons in 1935.

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Average weekly earnings in the majority of British industries are from one-half to two-thirds as large as weekly earnings in the same industries in the United States, while the number of hours worked per week in the British industries is from 20 to 50 per cent greater than in this country, according to a study of workers' earnings and hours in Great Britain made public by the National Industrial Conference Board.

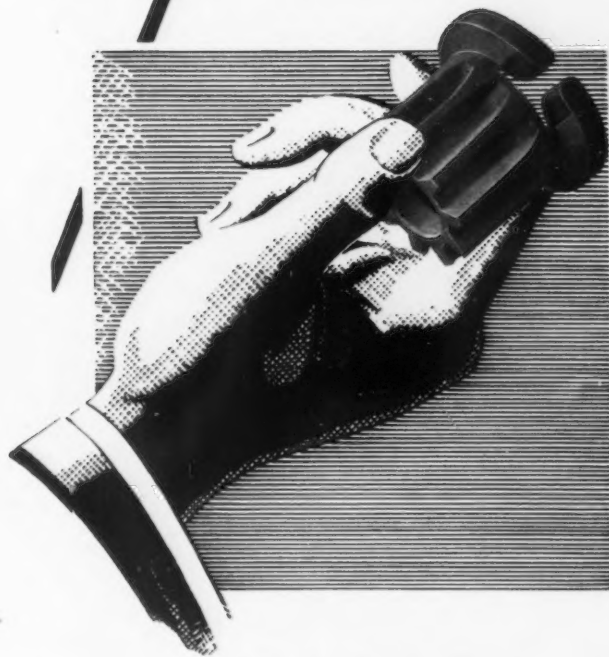
Industrial Unit Heater Association will hold its third regular meeting at the Hotel Cleveland, Cleveland, on July 15 at which time consideration will be given to the report of the engineering committee covering the standardization of unit heaters, a subject which has been under consideration for the past year.



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## Coal Operators Warn John L. Lewis Against Breaking Contract

**W**ASHINGTON, June 22.—Appearing last Thursday before the Senate Committee on Postoffices and Post Roads, Philip Murray delivered himself of a preachment on the refusal of steel companies to sign a union contract. Moralizing, he told the

committee that "it is only evidence of good faith to put such an agreement in writing."

Murray is chairman of the Steel Workers Organization Committee and vice-president of the United Mine Workers Union, both dominated by John L. Lewis, chairman

of the Committee for Industrial Organization and president of the United Mine Workers.

Considering the free, easy and irresponsible way in which CIO unions have violated signed contracts and gone on a rampage of strikes, notably in the motor industry, Murray's remarks sounded hollow. And coming at the time they did, they were peculiarly ironical. For his talk on good faith followed fast on the heels of a sharp telegram sent to Lewis by Byron H. Canon, secretary of the Western Pennsylvania Coal Operators Association, charging Lewis' and Murray's UMW with violating its contract with the association in forbidding the loading of coal at mines operated by association members for shipment to steel companies which are under SWOC attack.

"The rights which you assert the United Mine Workers of America reserve, viz.: to withdraw their membership from coal production . . . is a right which they do not possess because under the explicit terms of the contract between the United Mine Workers of America and this association, any such right is expressly negatived," Lewis was bluntly told.

Giving a bill of particulars to clinch the charge of violation of contract the telegram quoted the following paragraph in the signed agreement:

"The operators shall at all times be at liberty to load coal into any transportation equipment whatsoever, regardless of ownership, and to sell and deliver coal loaded into such equipment in any market and to any person, firm or corporation."

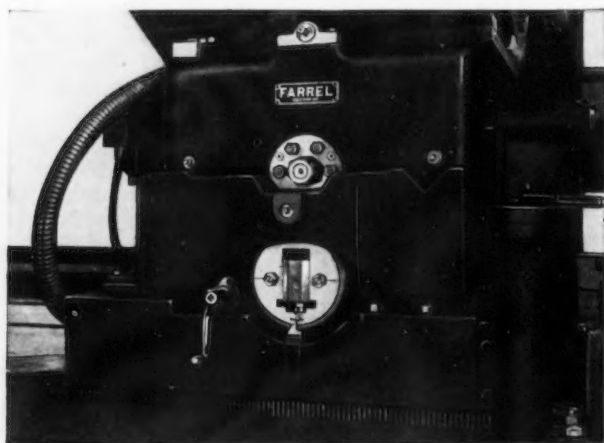
Set this devastating evidence of bad faith alongside pious talk of evidence of good faith, and the deed reduces empty words to mockery.

### Lewis Proposing to Violate Agreement

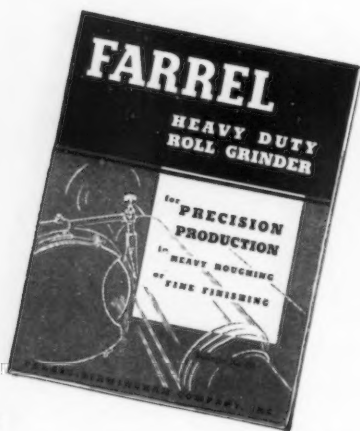
"At the very moment when in the public prints you are condemning business concerns for refusing to sign agreements with labor organizations dictated by you, you are here proposing openly and deliberately to violate your agreement with the coal producers of Western Pennsylvania," Lewis was spiritedly reminded.

Lewis was informed in no uncertain terms that, "No claim of 'spontaneous' refusal to load coal for this, that or the other customer of our members will carry any weight with us or the public in the face of these facts."

And finally the Lewis strategy of attempting the boycott to en-



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force CIO demands upon steel companies was met with definite notice that the coal operators would not submit to them. Being so fond of delivering ultimatums, Lewis ought to appreciate the words of the coal operators.

Said they: "After a thorough discussion of this extraordinary action on your part, the board of directors and the scale committee of this association voted unanimously that they will not be party in any manner to any boycott or attempt at boycott of any purchaser of coal from mines in this field, that they will not acquiesce in any such policy if attempted by you, nor will they acquiesce in any suggested modification of our contract for any such purpose, direct or indirect, but that they will hold you and your organization to the full measure of responsibility for the faithful performance of your contract with this association and its members."

The CIO boycott move by no means has been confined to coal shipments. It is being attempted with respect to shipments of scrap and iron ore and other materials to steel companies which are being attacked. Strikes are callously called or attempted even though they would affect suppliers and consumers that have agreements with the CIO or have not yet been made objects of organization moves. Motor companies, for instance, must not accept shipments from steel companies which the CIO is picketing. The matter of the motor company having contracts with such steel companies is of no moment. Nor is the matter of the CIO unions having contracts with the motor companies of the slightest importance. Either the union boycott must work or a strike is in order. So the prating about a contract as an evidence of good faith comes with poor grace from those who, exempted from responsibility, treat contracts with responsible industry as mere scraps of paper.

## Railroad Buying Increases Steadily

**R**AILROAD purchases for the first five months of this year are estimated to have totaled \$552,-381,000, as compared with \$379,-458,000 for a comparable period in 1936, according to *Railway Age*. For the first time since 1929 the railroads are spending 15.7 per cent of their gross operating revenue for materials and supplies, exclusive of equipment and fuel.


## Welding Design Chart Revised

**T**HE engineering drafting room chart brought out by the Lincoln Electric Co., Cleveland, to provide in concise form data necessary for producing arc welded designs, has been revised to include the latest weld symbols adopted by the American Welding Society. Data also include illustrations and par-

ticulars regarding the 16 types of joints for arc welding; suggestions for better welded design, and sketches explaining the nomenclature of welds. There are also tables giving properties of base metals, weld metals, electrode metals for hard facing, length of fillet welds to replace rivets, and safe allowable loads for fillet welds in shear. The chart is 24 in. wide and 35 1/2 in. high, and its printing is such that copies may be blueprinted for distribution to individual draftsmen.

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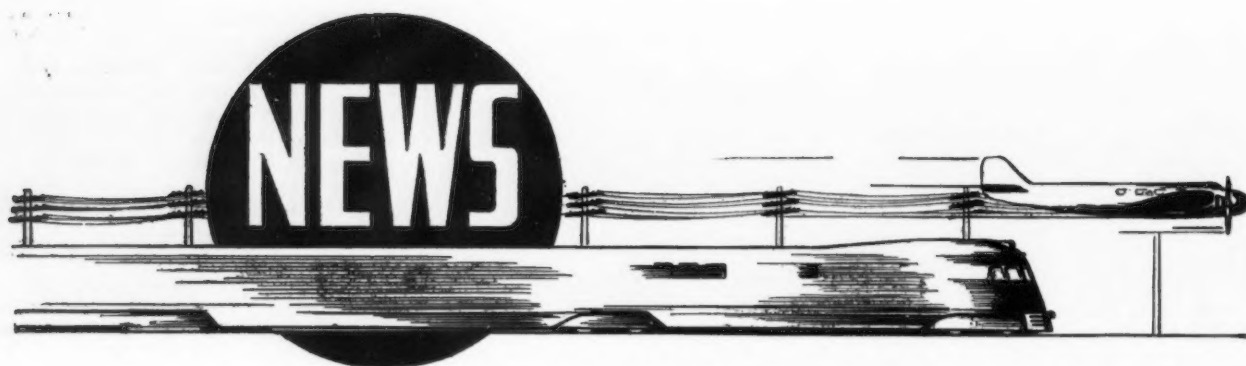
In railway freight handling, Towmotor tractors set the pace with high speed in both forward and reverse. Push as well as pull. Turn in a 5 ft. radius. Towmotor lift trucks quickly convey materials in stacks, saving trips. 24 hour uninterrupted service with straight gas power. Write for new bulletins.

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## Newspaper Comment Strongly Critical of Roosevelt and Earle in Strike Situation

*(Newspaper comment is veering strongly to the side of the strike-affected steel companies. All of this does not come from newspapers or commentators whose sympathies might logically be expected on that side of the issue. Arthur Krock, head of the Washington bureau of The New York Times, who has been described by some other newspapers as "Roosevelt's friend Krock" has freely criticized the President for his one-sided comment at a press conference regarding signed labor agreements. The trend of newspaper comment clearly indicates that the political mistakes of the President and Governor Earle of Pennsylvania are turning public opinion, as reflected by the newspapers, clearly in the direction of the steel companies. Some of the*

*pertinent newspaper comment of the metropolitan press in the past week is quoted below.—Editor.)*

### President Has Hampered His Own Mediation Board

*(By Arthur Krock in The New York Times)*

"THE citizens who constitute the Government board which is to attempt mediation of the steel strike will begin under an unusual handicap, perhaps a unique one in a task of this sort. For the very man who, at the instance of the Governor of Ohio, signed the administrative order that commissioned the mediators has already taken the strikers' side of the basic issue that is to be mediated. He is the President. \* \* \*

"So far as Mr. Roosevelt himself is concerned, there is therefore nothing to mediate in the dispute he has set up a board to adjust. By general agreement the battle is waged, the strike was called, because the independent steel makers declined to put an agreement into the form of a contract with the CIO union. The President does not see why, in "common sense," they should refuse. His commission thus begins its labors under the impressive shadow of its creator's opinion. \* \* \*

"In all probability the commission will find that the unwillingness of the steel men to make a formal contract out of an agreement is because the present Federal industrial policy is a one-way affair. The law requires the employer

### NEWS AND MARKET INDEX

Personals	89	New York Market	107
Obituary	85	Fabricated Steel	108
Comparison of Prices	90	Non-ferrous Market	109
Steel Ingot Production	96	Scrap Market and Prices	110-111
Summary of the Week	97	Finishing Iron & Steel Prices	112-113
Pittsburgh Market	98	Warehouse Steel Prices	114-115
Chicago Market	101	Pig Iron & Raw Material Prices	116
Philadelphia Market	103	Machine Tool Activity	118
Cleveland Market	105	Plant Expansion & Equipment	122

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**UNIT VOLUME.** Each trip, the Truck transports 30 filled bags of 100 lbs. each. Average net load per trip, 3000 lbs.

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Elwell-Parker has been originating and applying progressive methods of materials-handling for more than 30 years. Today it is enabling customers in all major fields to reduce these costs sharply, by providing modern, re-designed Trucks, Tractors and Cranes capable of moving larger loads, at greater speed, with safety to men and machines.

Your nearby Elwell-Parker Engineer is available for consultation with your own Engineers. Send for him. The Elwell-Parker Electric Company, 4225 St. Clair Avenue, Cleveland, Ohio.

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to keep his contracts, and he is promptly subject to the collection of damages and other penalties if he breaks them. But the law, including the Wagner act, puts no such obligation on employees. Until that situation is remedied it is probable the United States will be full of executives who will resist signing one-way pacts."

#### Necessity for Labor to Assume Responsibility Seems Now to Be Recognized

(By David Lawrence in syndicated newspaper article)

"THE independent steel companies have probably won their strike. Appointment of a Federal mediation board by President Roosevelt has all the earmarks of a recognition at last by the Administration that labor must assume its full share of responsibility if it wishes to deserve to get a signed contract from employers.

"The three mediators are able persons, every one of them with a liberal outlook. They make an unusual board of mediation. It cannot be called a tribunal of one employer representative and one employee representative and one neutral, a composition which frequently produces a deadlock and a decision by one man.

"In this instance, all three mediators have about the same point of view. They are friendly to labor, but they know that, unless they can give assurances to capital, no mediation board in the future and no government tribunal will ever do the job. \* \* \*

"As matters stand today, the President has passed the buck, so to speak, to three skillful mediators, and if they can't settle the steel strike, nobody outside the two parties to the dispute in a bitter-end fight could ever do it."

#### Perilous Politics

(An editorial in The New York Times)

"There can only be one justification for the modified form of martial law which I have ordered to be put into immediate effect. That is the maintenance of law and order.' With this theory of Governor Earle none can fail to agree. When, however, the execution of his order takes the form of depriving men who wish to work of their ability to do so, when it fails to furnish the protection to which each citizen is entitled in the normal pursuit of his activities, when the armed power of the State is invoked to furnish the shock troops for illegal picketing, then martial

law is without justification and the Governor's words become a perilous, political harangue."

#### A Double Task

(An editorial in The New York Herald Tribune)

"If Mr. Roosevelt had not already made unmistakable display of his bias in the steel dispute, his act of intervention now and the form it has taken would deserve more acclaim than it is likely to receive. In the circumstances the suspicion will be widely entertained that he was moved, in part at least, to authorize the appointment of a board of mediation because the strike seemed to be going against the strikers. The return of workers by the hundreds to the Johnstown mills of the Bethlehem Steel Corp., the lesson of Monroe, Mich.; the growing strength of the back-to-work movement through the affected districts, and the rapidly rising resentment of the public generally over the tactics of Lewis and his pickets—all were indications that Lewis was headed for his first major defeat. Had he been winning, would the President have stepped in? Is he doing so in re-

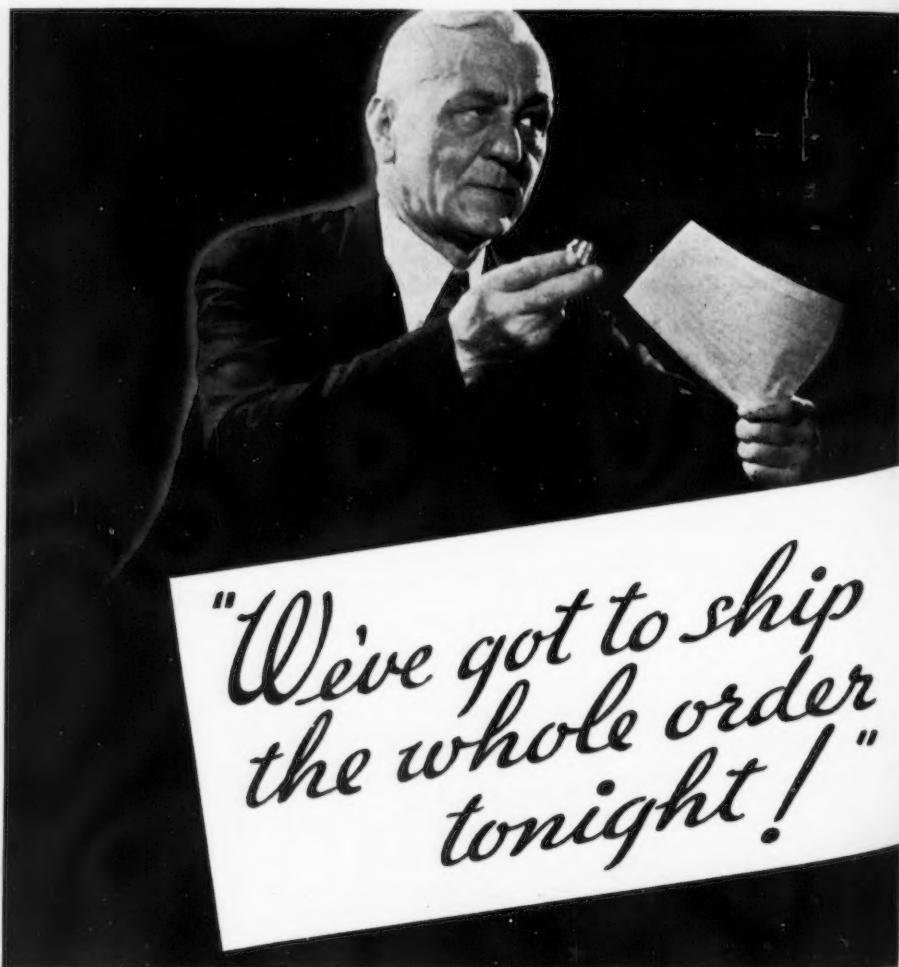
sponse to the appeals of Governor Davey of Ohio and Mayor Shields of Johnstown, or rather because Mr. Lewis has requested it?"

#### Governor Earle and the Gangsters

(Editorial in The New York Herald Tribune)

"President Eugene Grace of the Bethlehem Steel Co. deserves the congratulations and thanks of every sound American citizen for refusing to submit to Governor George Earle's demand that he close the company's Johnstown plant. By doing so he has forced Governor Earle to declare martial law and to close the plant by military ukase, so that the State of Pennsylvania would not have to defend a great private enterprise and thousands of its workers in their civil rights against a highly organized expression of contempt for law and order.

"Mr. Grace has forced Governor Earle to choose between his duties to the people of Pennsylvania, as the Chief Executive of that great commonwealth, and his personal political obligations (past and prospective) to John L. Lewis. Mr.



Grace has forced Governor Earle, the rich and lily-handed exploiter of class warfare, who hopes to succeed Mr. Roosevelt in the White House, to move openly and definitely into the camp of the CIO terrorists and to offer them the support of Pennsylvania's state police and militia at need. This is a great service. \* \* \*

"The Government of Pennsylvania has gone into action in full military support of labor gangsterism on a gigantic scale. Further comment on such a situation is futile. It not only speaks for itself; it shrieks for the attention of the whole nation."

The board of directors of the Jones & Laughlin Steel Corp. at its meeting last week, decided not to declare the regular dividend on its cumulative 7 per cent preferred stock, payable July 1, 1937; but declared a dividend of 1¼ per cent (\$1.75 per share) on account of arrearages in dividends on its preferred stock, to holders of record at the close of business June 30, 1937, payable July 15, 1937.

## Railroad Convention Held Again After a Lapse of Seven Years

**I**N an atmosphere of revived hopefulness for the railroads and for the equipment and supply trade, the Association of American Railroads and the Railway Supply Manufacturers' Association met June 16 to 23 for the first time since 1930 when these annual conventions were discontinued because of the depression. As in former years, the meetings and exhibit of mechanical equipment took place at Atlantic City.

Aside from labor troubles affecting large shippers and those which threaten to affect the railroads themselves, there was a feeling of optimism that over the next few years the railroads will have a large volume of traffic, and, to take care of this traffic, will be obliged to continue the rehabilitation of equipment and plants which was begun so auspiciously in the past year.

The exhibits were a striking manifestation of the revived hopes

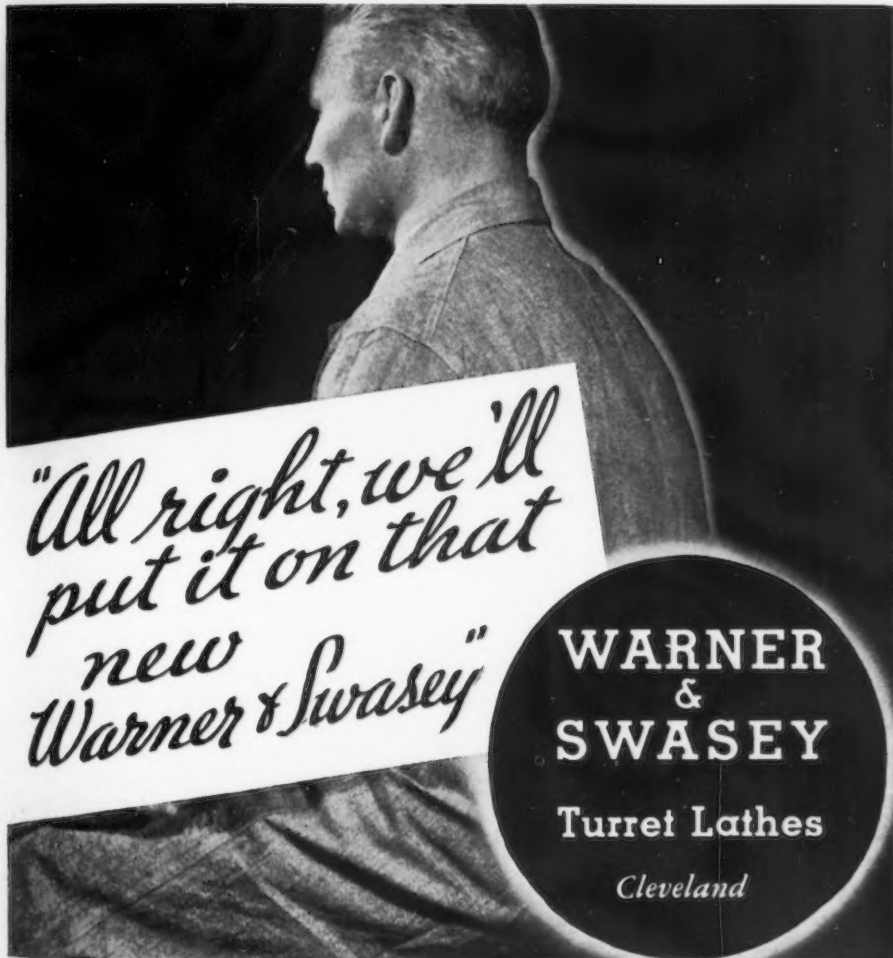
for railroad prosperity. Two floors of the Atlantic City Municipal Auditorium were filled to capacity with products shown by steel companies, machine tool builders, railroad supply manufacturers and others who cater to railroad requirements.

A track exhibit in the Union Station was an interesting revelation of the changes that are occurring in railroad equipment — locomotives, passenger cars and freight cars. Chicago, Rock Island & Pacific had one of its high speed stainless steel trains on view and it was visited by thousands. Pullman-Standard Car Mfg. Co. exhibited a number of new types of passenger equipment, among them a "Roomette" sleeping car which will soon be tried out experimentally. This car consists of 18 individual rooms each one complete with a bed, which pulls down from the wall, lavatory and toilet. It promises to revolutionize sleeping car service if public reaction is favorable. Several of the newer type locomotives were shown including one in which the engineer sits in a forward compartment in the same manner as a motor bus operator.

There were also many types of freight cars in the construction of which the new light weight high tensile steels predominated. Illustrating the changes being brought about by the use of light weight steels was a 70-ton Bessemer & Lake Erie car of Cor-Ten steel weighing 45,700 lb. Also on display in close proximity to it was a 70-ton car of carbon steel of the same type weighing 56,000 lb. which has been in service on the Bessemer & Lake Erie lines since July 1, 1896.

## Semet-Solvay Gets Benzol Plant Award

**A** CONTRACT for the world's largest benzol refining plant has been awarded by the Carnegie-Illinois Steel Corp. to the Semet-Solvay Engineering Corp., New York, to be erected at Clairton, Pa. The new project will be a complete, modern unit. The light oils recovered from the by-product coke ovens will be processed in the new equipment to obtain benzol, toluol, xylol, solvent naphtha and residues.



*"All right, we'll put it on that new Warner & Swasey"*

**WARNER & SWASEY**

**Turret Lathes**

*Cleveland*



## Associated Machine Tool Dealers Hold Spring Meeting

WITH eight or more formal addresses, the reports of as many standing committees, and the reports of the association's officers, an excellent program featured the ninth spring meeting of the Associated Machine Tool Dealers, held at Skytop Lodge, Skytop, Pa., June 14 and 15. Golf and other between-session recreation was amply arranged by the entertainment committee headed by J. F. Owens, Owens Machinery Co., Syracuse, N. Y.

The meeting was well attended, and discussion of the various addresses and reports was active. All sessions were presided over by Harry Barney, Barney Machinery Co., Pittsburgh, president of the association.

Three new members were announced. They are: The C. F. Bulotti Machinery Co., San Francisco; W. P. & R. S. Mars Co., Duluth, Minn., and the Meyer Machinery Co., Los Angeles.

Thomas A. Fernley, Jr., Phil-

adelphia, was appointed executive secretary in place of H. R. Rinehart, who has resigned to take up other duties, and W. K. Stamets, William Stamets, Inc., Pittsburgh, was named chairman of the association's membership committee.

In addition to Mr. Barney, officers of the association are: A. G. Bryant, Bryant Machinery & Engineering Co., Chicago, vice-president; and John Sauer, Jr., Peninsular Machinery Co., Detroit, secretary-treasurer.

An interesting review of current legislation, particularly that affecting the machine tool industry, was followed at the opening session by a comprehensive report of the association's relations committee, presented by J. Roy Porter, Marshall & Huschart Machinery Co., Chicago, chairman of the committee. Discussion centered around the Walsh-Healey Act, particularly the need of a broader definition of a "machine tool dealer"—one that would more exactly reflect the

functions of a dealer in relation to Government contracts. Further definition is required to differentiate a dealer from a broker who, without warehouse or display stock, sub-contracts to the lowest bidder he can find. The holding of regional meetings by the various geographical groups was suggested.

Omar S. Hunt, Marshall & Huschart Machinery Co. of Indiana, reported for the ethics committee, and E. P. Essley, E. L. Essley Machinery Co., Chicago, reported for the standardization committee, which has under consideration the preparation of data comprising various tables and formulas of use to machine tool dealers' salesmen.

The continuing need of an effective selling technique and the training of the best possible salesmen were emphasized by Mason Britton, senior vice-president, McGraw-Hill Publishing Co., New York, in an address at the same session.

### Dinner Meeting A High Spot

One of the high spots of the convention was the dinner meeting the evening of June 14, with addresses by Tell Berna, general manager, National Machine Tool Builders' Association, and by J. R. Weaver and L. D. Rigdon of the Westinghouse Electric & Mfg. Co., East Pittsburgh, and brief discussion by H. C. Pierle, secretary and sales manager, R. K. LeBlond Machine Tool Co., Cincinnati, William K. Stamets, and others. Mr. Weaver is director of works equipment, inspection and test, and Mr. Rigdon is works executive and director of equipment of the Westinghouse company. They spoke in the absence of T. I. Phillips, Westinghouse general works manager, who was to have addressed the convention on "What Machine Tool Dealers and Builders Can Do For Industry."

Mr. Weaver pointed out that a major problem is still the production obtainable from machine tools. In this connection it is interesting to note that special products require general-purpose machines and standard products take special machine tools. Development of the latter has helped development of standard machine tools. Inasmuch as handling time ranges from 50 to 80 per cent of the floor-to-floor time; further attention should be given, he said, to fixtures and holding devices, to eliminate fatigue and lost time. In speaking of delayed deliveries of machine tools, Mr. Weaver pointed out that such delays can often hold up an important expansion program. In another part he indicated that demand for machine tools, both for expansion and replacement, should

## MARSCHKE HEAVY DUTY GRINDERS AND BUFFERS

THIS illustration shows a NARROW TYPE MARSCHKE GRINDER STAND with 3 H.P. motor. Other sizes of this same type of Marschke Grinder are available with 1 to 5 H.P. motor sizes.

This is a popular machine for general utility, as well as tool grinding, but there are a dozen other types of Marschke Grinders—all sizes—for wheels from 10" to 30" diameter and motor sizes ranging from 1 to 25 H.P.

The Marschke line also includes Buffers and there is a type as well as size of Marschke Grinder or Buffer best suited for your particular requirements.

A catalog showing the full line of Marschke Grinders and Buffers, will be sent promptly upon receipt of request.

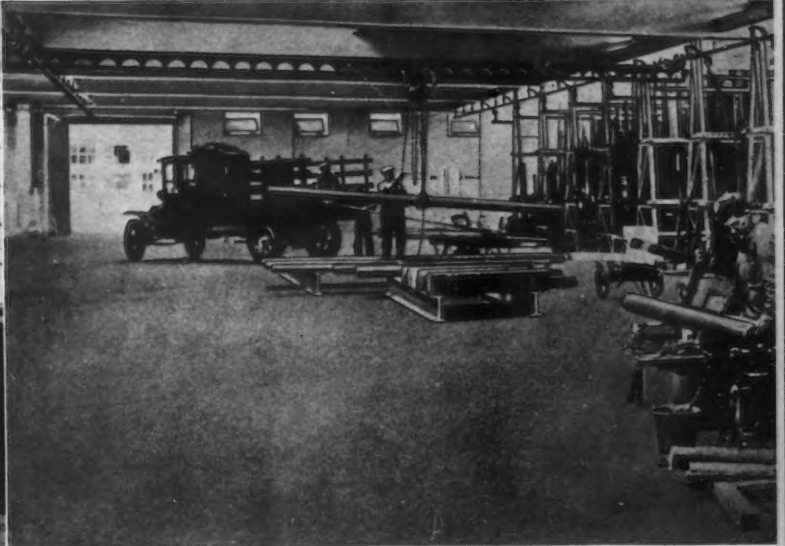
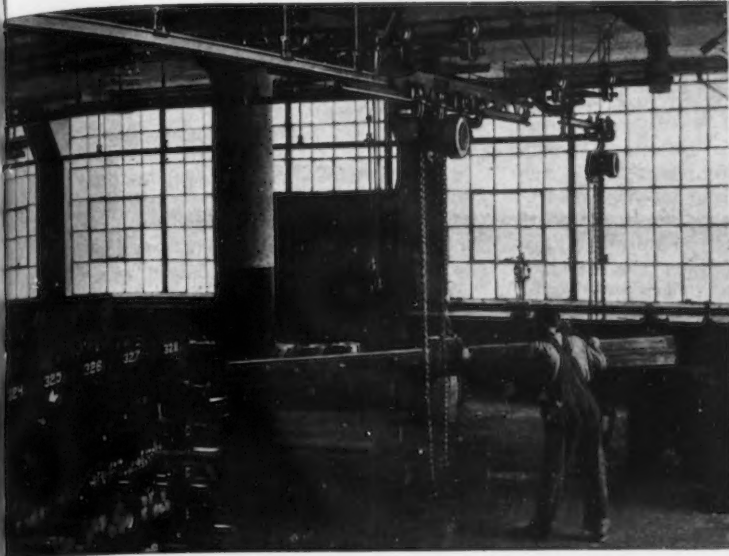
### VONNEGUT MOULDER CORP.

1807 Madison Ave., Indianapolis, Ind.





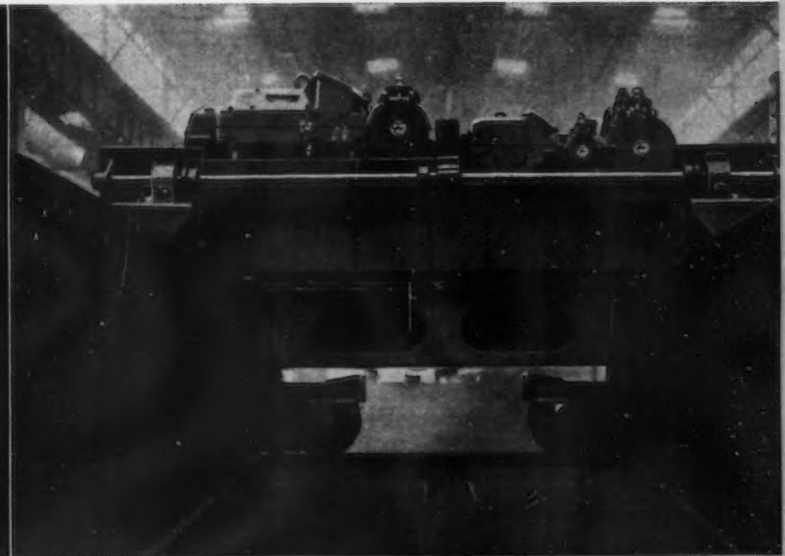
## CLEVELAND TRAMRAIL MATERIALS HANDLING EQUIPMENT



Consult your phone directory under Cleveland Tramrail

● Bar stock and other long and unwieldy loads are another of the every day applications of Cleveland Tramrail equipment to industry. From unloading dock, to and from storage to saws, shears or the production line in planned unit loads and at speeds to set the production.

## CLEVELAND ALL WELDED CRANES FOR EVERY INDUSTRY



● NO MISALIGNMENT OF CLEVELAND CRANE TROLLEYS POSSIBLE. They are assembled onto a rigid one-piece welded frame. Any part can be removed by a vertical lift without disturbing or removing adjacent parts. Bearings are mounted on the side frames thus transmitting loads directly to the axles with a minimum of deflection. Result — long, efficient, trouble-free service.

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**CRANES**

NEW YORK • DETROIT

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## THE CLEVELAND CRANE & ENGINEERING CO.

1115 Deport St.

WICKLIFFE OHIO

be good for quite a number of years.

In the general discussion of Mr. Weaver's address it was pointed out that failure to keep delivery promises was often due to delayed deliveries on the part of suppliers of bearings and other machine parts. The suddenness of the current "boom" with the necessary employment of comparatively green men, with a higher than usual rate of spoilage, was another factor

mentioned in the discussion. Mr. Weaver's remarks relating to opportunities in reducing time of handling work in and out of machines were indorsed by other speakers.

Mr. Rigdon, in his address, outlined the Westinghouse unit management plan and spoke of the large-scale elimination in 1933 of old and obsolete equipment by various units. Since then equipment has been systematically

studied and retooled or scrapped as operating costs indicated. Most of the company's machine tool buying since 1935 has been for expansion, rather than for replacement.

#### Improving Selling Technique

The importance of improving selling technique and the methods of salesmen, with a view to the maximum of constructive service to customers of the industry, was emphasized by Mr. Berna in his address. We are facing rapidly changing conditions and must adapt our methods accordingly, he said. The service rendered by machine tool dealers, especially to the small machinery manufacturer who cannot afford to build up a comprehensive sales organization, was touched upon by Mr. Berna.

The foreman as a factor in the buying of machine tools was discussed by Franklin D. Jones, associate editor, *Machinery*, New York, at the concluding session. In speaking on "The Value of Studies Covering Overhead Expenses," H. R. Rinehart showed the overhead expense report recently issued by the research bureau of the National Supply and Machinery Distributors' Association to illustrate the type of work being done in this direction in the industrial supply field.

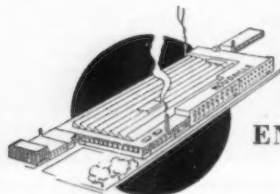
#### New German Pyrite Cinder Process

A NEW process which enables the smelting of pyrite cinders with high zinc content in blast furnaces has been announced in Germany, according to reports from Consul Sydney B. Redecker, Frankfurt-on-Main, made public by the Commerce Department's Chemical Division. The discovery is of particular importance to that country as it promises to increase its domestic supply of raw material base for iron and zinc, especially through the utilization of extensive waste dumps, the report states. German iron pyrites have always labored under a considerable handicap owing to their high zinc content, it is pointed out, and while other processes for zinc recovery have been developed, none until the one recently announced, have enabled blast furnaces to effectively utilize pyrite cinders.

Following the successful operation of a large scale pilot plant, the technical problem involved in the smelting of spent residues is now considered solved and is expected to result in considerable benefits to the domestic pyrite industry.

**MAEHLER OVENS**  
for all baking applications  
**The PAUL MAEHLER CO.**  
2218 W. LAKE ST. - CHICAGO

**M**ORE and more during the past few years, Houdaille has been devoting its engineering skill and experience and its highly specialized machining equipment to the production of parts and assemblies for certain nationally known manufacturers. Today Houdaille is in position to offer its facilities to still others—squarely upon the basis of greater precision and lower production costs. The only way you—and we—can determine whether we can do for you what we have done for others is to ask us to talk it over with you.



**HOUDAILLE**  
ENGINEERING CORPORATION  
BUFFALO, N. Y.

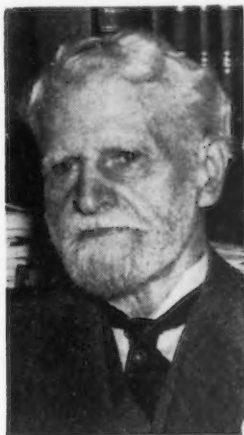
A DIVISION OF HOUDAILLE-HERSHEY CORPORATION



## ...OBITUARY...

### Ambrose Swasey

AMBROSE SWASEY, philanthropist, scientist and inventor and chairman of the board of Warner & Swasey Co., died June 15 in his 90th year at his summer home in Exeter, N. H., of pneumonia, after a month's illness. Burial will be in Exeter, where Mr. Swasey was born on Dec. 19, 1846. The schools



AMBROSE SWASEY

of that town afforded him his only education and there he learned the machinist's trade in the Exeter Machine Works. Five years later, in 1870, he entered the employ of Pratt & Whitney at Hartford, Conn., became especially interested in gear cutting and was placed in charge of the department. He devised and perfected the epicycloidal milling machine for producing the true theoretical curves from which cutters for gear teeth are made.

He also invented a new gear cutting engine for generating and simultaneously cutting the teeth for spur gears. There he met the late Worcester R. Warner, with whom after 10 years at the Pratt & Whitney plant, he formed in 1880 a partnership for the manufacture of machine tools and astronomical instruments. The firm's first plant was built in Chicago.

In 1881 it moved to Cleveland, and afterward was incorporated. Mr. Warner died in 1929 at the age of 83.

Among Mr. Swasey's inventions

are an automatic dividing machine capable of dividing a circle into 10,000 parts with an error not to exceed one second of arc, the Swasey depression position finder for seacoast defense fortifications. Machine tools manufactured by the company he formed are known the world over.

Many outstanding astronomical instruments and telescopes were

produced by the company under Mr. Swasey's personal direction. He cooperated in designing the 200-in telescope for the University of California, the largest of its kind in the world.

In 1906 the Warner & Swasey Co. enlarged its plant to three times its former size, but though its capacity never was sufficient to meet demand, the two partners re-

# ARMSTRONG



## SOCKET WRENCHES



Standardize on ARMSTRONG Socket Wrenches. (1st) For finer tools—chrome Vanadium Steel chrome plated. (2nd) for uniformity and interchangeability — ARMSTRONG SOCKETS are made in all sizes in all standard types. (3rd) for improved drop forged ratchets, and (4th) for the Drivelock Feature.

The patented ARMSTRONG Drivelock makes of every assembly a safe, rigid tool. A quarter turn of the lock pin locks socket to driver, driver to ratchet, section to section. With ARMSTRONG Drivelock tools you can use any standard make sockets.

### ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

**SAFE** because of the  
drivelock

309 N. Francisco Ave., Chicago, U.S.A.

NEW YORK

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## TOOL STEEL

### Trial and Error

is an expensive way to select tool steel. Avoid the false starts by calling in one of our representatives and presenting your problem to him.

He'll give you the benefit of our fifty years' experience in providing the world's finest steels for thousands of varied uses. Write, telephone, telegraph, or teletype . . . today.

# A. MILNE & CO.

1887 — FIFTY YEARS OF FRIENDLY SERVICE — 1937

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745 Washington St.  
Tel. CHelsea 3-5315

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915 Oliver Bldg.  
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Tel. MADison 1170-1171

### PITTSBURGH

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jected all plans for further expansion.

In 1914 Mr. Swasey made the initial gift of \$500,000 which established the Engineering Foundation "for the furtherance of research in science and engineering, or for the advancement in any other manner of the profession of engineering, and the good of mankind." Other benefactions included endowing a chair of physics at Case School of Applied Science with \$100,000; gift of the pavilion and parkway in his native town of

Exeter, N. H.; the astronomical observatory and chapel at Dennison University; the Science Hall of the University of Nanking, China; the Christian Association Building of the Canton (China) Christian College; and part gift of the Warner & Swasey Astronomical Observatory to Case School of Applied Science.

Hundreds of honors were conferred upon Mr. Swasey during his long lifetime. The decoration of chevalier of the Legion of Honor was conferred on him by the

French Government in 1900 for achievements in the design and construction of astronomical instruments (in 1921 promotion was given to officer of the Legion of Honor); the John Fritz gold medal by the engineering profession in 1924, its highest honor, for contributions to development and progress of engineering; honorary degree of doctor of engineering in 1905 by Case School of Applied Science; honorary degree of doctor of Science in 1910 by Dennison University; honorary member of the Society of Cincinnati in 1919; honorary degree, LL.D., in 1924 by the University of California. Later the University of Rochester conferred on him this same degree, and the University of Pennsylvania and the University of New Hampshire gave him honorary degrees of doctor of Science.

The last honor bestowed on Mr. Swasey was the award of the Hoover Medal on Dec. 2, 1936.

He was a trustee of Case School of Applied Science, Western Reserve University and Dennison University; past-president of the Cleveland Y.M.C.A., past-president of the Baptist Education Society of New York State and honorary president of the First Baptist Church of Cleveland. In addition, he was an honorary member of the Institute of Mechanical Engineers and the Institute of Mining Engineers of Great Britain, also of the Societe des Ingenieurs de France. He was a member of the British Astronomical Association and a fellow of the Royal Astronomical Society.

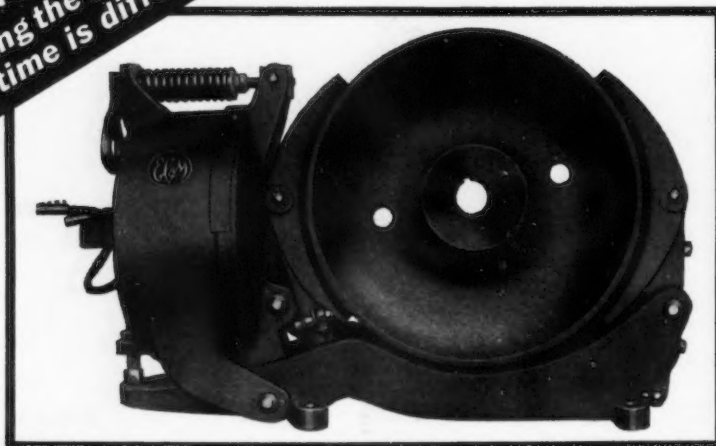
He was a past-president and honorary member of the American Society of Mechanical Engineers and the Cleveland Engineering Society, and a member of the National Research Council, the American Philosophical Society and the National Academy of Sciences.

Mr. Swasey belonged to the Cleveland Chamber of Commerce, of which he was a former president. He was a member of the Cosmos Club of Washington, the Union League, the Engineers and Grolier Clubs of New York and the Cleveland Union and Country Clubs.

♦ ♦ ♦

MELVILLE STONE FLINN, secretary and treasurer, Flinn & Dreflein Corp., Chicago, fuel engineer, died of heart ailment in Bermuda, June 16, aged 56 years. Mr. Flinn was graduated in 1904 from the Armour Institute of Technology, following which he went with the Oliver Typewriter Co. as engineer. Leaving this organization a year later, he became associated with the

Getting  
**BRAKING ACTION**  
and getting the same amount  
every time is different . . .

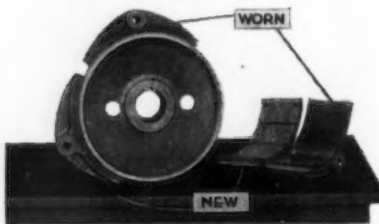


Type WB Brake on Trolley Motor on  
12-Ton Ore Handling Bridge

The Brake Blocks used on EC&M Type WB Brakes are made from an extremely tough, non-compressible material which has a constant coefficient of friction throughout its entire life. This not only gives uniform braking action throughout the life of the material, but when properly adjusted, causes uniform wear from the day the brake is installed until all the permissible wear is consumed. And EC&M WB Brakes are designed with blocks permitting larger-than-average wear—from  $\frac{1}{8}$ " per shoe on the smallest size to  $\frac{1}{2}$ " on the largest size.

In addition, Type WB Brakes offer many other outstanding advantages, such as—quick armature removal—long wear before adjustment is necessary—and only one adjustment to compensate for this wear. Ask for Bulletin 1004-B describing these brakes.

Although WB Brake Blocks hold their frictional quality longer than any other braking material, replacements when necessary, can be easily and quickly made, because these blocks are accurately formed and ground on both sides to uniform thickness. A new block can be easily attached to the finished surface of the brake shoe and it will fit the arc of the wheel with the same degree of accuracy as the original block.



HEAVY DUTY MOTOR CONTROL  
FOR CRANES, MILL DRIVES AND  
MACHINERY • BRAKES • LIMIT  
STOPS • LIFTING MAGNETS AND  
AUTOMATIC WELD TIMERS

Industrial Gas Co., New York, and in 1907 joined with H. A. Dreffein to form the present corporation. A member of the American Society of Mechanical Engineers, Illinois Athletic Club, Chicago Athletic Club, and the Exmoor Country Club, Mr. Flinn was an expert amateur billiard player and amateur photographer.

♦ ♦ ♦

CHARLES A. STRELINGER, founder and president of the Charles A. Strelinger Co., Detroit, dealer in machinery, tools, metals and shop supplies, died June 16 at his home in St. Louis. He was 81 years old. Mr. Strelinger began his business career working for a hardware merchant in Detroit in 1870. Fourteen years later he opened his own hardware and tool business. Subsequently he located his shop at Bates Street and Congress Avenue, and operated there for 28 years before moving his business to its present location on Larned Street in downtown Detroit. After the death of his wife five years ago, Mr. Strelinger moved to St. Louis.

♦ ♦ ♦

OSCAR J. RIVERS, superintendent of manufacture of the Yonkers, N. Y., plant of the Otis Elevator Co., died of a cerebral hemorrhage in that city on June 8, aged 56 years. He started with the company in 1903 as a toolmaker in the plunger elevator division of the Otis company. He was transferred to the Buffalo plant of the company in 1906 as plant superintendent. Ten years later he became assistant superintendent of the Yonkers works and later superintendent of manufacture.

♦ ♦ ♦

EDWARD EVERETT BELL, for many years secretary and treasurer of E. Horton & Son Co., chuck manufacturer of Windsor Locks, Conn., died suddenly of a heart attack at his home there on June 10 at the age of 78. He had been in retirement since January, 1931, after being actively connected with the company for 51 years. He was born in Java County, N. Y., and moved to Windsor Locks in 1880, when he joined the Horton company.

♦ ♦ ♦

ROBERT RUSSELL KEITH, manager of the tractor works of the J. I. Case Co., Racine, Wis., and vice-president of the Society of Automotive Engineers, representing production engineering, died of a heart attack on June 13 at Ames, Iowa, while attending the thirty-fifth annual reunion of his graduating class at Iowa State College,

He was 58 years of age and a native of Des Moines.

♦ ♦ ♦

J. ROSS WHITNEY, 45 years old, secretary and director of Federal Drop Forge Co., Lansing, Mich., for the past 17 years, died June 14 from an attack of indigestion while weekending at Roscommon, Mich.

♦ ♦ ♦

WILLIAM LATTA, Evart, Mich., connected with the American Log-

ging Tool Co. for 50 years and treasurer of the company for 30 years, died June 14 at the age of 81.

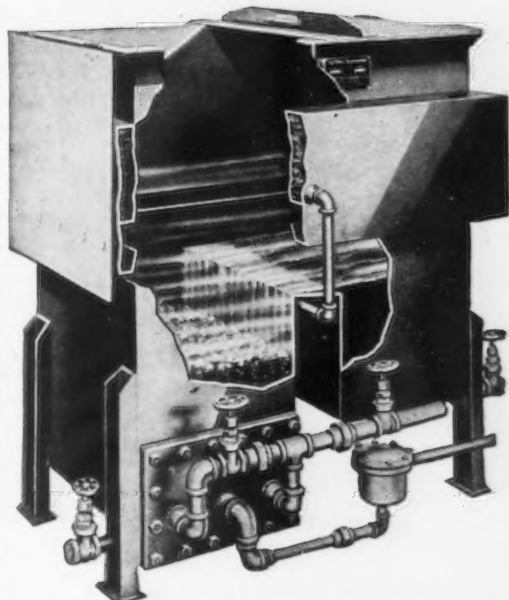
♦ ♦ ♦

RICHARD C. STEWART, cofounder and chairman of the board of the Stewart Iron Works Co., Covington, Ky., died at his home in that city on June 14, aged 80 years. He had been a lifelong resident of Covington. With the late W. A. Stewart, he founded the iron works 51 years ago.

## STOP WASTE In Your Cleaning Department!

No matter what method you are now using, you will find the improved Detrex Degreasing Process profitable to you.

This superior cleaning method quickly and easily removes oil, grease, drawing compounds, and polishing and buffing materials from all kinds of metal products. Furthermore, work emerges warm and dry—ready for subsequent finishing. Muss, fuss, scrubbing, and extra drying operations are entirely eliminated.



Steam-heated Detrex Degreaser. Piping shown on front of machine is supplied by user.

It will pay you to investigate how Detrex Degreasing simplifies cleaning, eliminates rejects, increases production, and lowers over-all cleaning costs.

### Trial Offer of a Detrex Degreaser

Without obligation to purchase, you may make a three weeks test of one of our standard units—with your own workmen—on your own production. You can then best judge the efficiency and economy of Detrex Solvent Degreasing. Your only expense will be the small transportation charges and the solvent used.

## DETROIT REX PRODUCTS COMPANY

Metal Cleaning Engineers — Solvent Degreasing and Alkali Cleaning

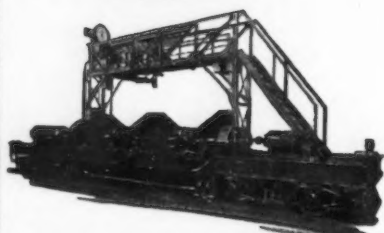
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# ATLAS CARS



Double Compartment Scale Car with Overhead Operator's Platform. Car provided with Orr Bin Gate Operating Mechanism.



20 Ton Capacity Double Compartment Scale Car for use with Orr type Bin Gates controlled from Operator's Station on Scale Car.

## Atlas Products

Gas-Electric and  
Diesel-Electric Locomotives

Electric Transfer Cars  
for Blast Furnaces and Steel Plants

Stockhouse Scale Cars  
for Blast Furnaces

Concentrate and Calcine Cars  
for Copper Refineries

Automatic and Remote Controlled  
Electric Cars

Pushers, Levellers, and  
Door Extractors

Coal Charging Lorries,  
Coke Guides and Clay-Carriers

Atlas Patented Coke Quenching  
Cars for By-Product Coke Ovens

Atlas Patented Indicating and  
Recording Scales

Special Cars and Electrically  
Operated Cars for every  
conceivable purpose.

**THE ATLAS CAR & MFG. CO.**

*Engineers - Manufacturers*

**1140 Ivanhoe Rd., Cleveland, O.**



## ..PERSONALS..

T. E. HUGHES, chief maintenance engineer of the Duquesne plant of the Carnegie-Illinois Steel Corp., has been elected chairman of the Pittsburgh district of the Association of Iron and Steel Engineers for the period Aug. 1, 1937, to July 31, 1938. His business life has been solely with the steel industry. Mr. Hughes started to work with the Union Railroad in 1902 and has been successively employed at the Clairton works of Carnegie-Illinois Steel Corp., McKeesport plant of National Tube Co., Youngstown plant of Youngstown Sheet & Tube Co., and for the past 25 years, Duquesne plant of Carnegie-Illinois Steel Corp.

GEORGE E. HOPF, Henry Disston & Sons, Inc., Philadelphia, has been made manager of hardware sales of the company, succeeding ERNEST QUERY. Mr. Hopf joined the Disston company in 1923 as assistant to the advertising manager, and in 1928 was made manager of the company's sales promotion department. Five years later he was advanced to the position of assistant manager of hardware sales. For 11 years prior to 1923, Mr. Hopf was associated with *Hardware Age* in various sales department capacities.

FREDERICK E. BARTH, for 11 years vice-president of Graton & Knight Co., Worcester, Mass., has been elected president of the com-

pany, succeeding the late Frank H. Willard. Mr. Barth has been with the company since 1919, serving first as office manager and then as general sales manager from 1924 to 1926, when he was elected vice-president and assistant general manager. He was graduated from Pace Business Institute in 1914 and started his business career as a clerk with a book publishing company. Later he joined the L. L. Harr Corp., production and accounting engineers, with whom he went to Worcester in 1917 to work on production problems in the Graton & Knight factory.

DONALD C. BAKEWELL has resigned as vice-president and chairman of the executive committee of the Continental Roll & Steel Foundry Co., Pittsburgh, in which capacity he has served since 1930, to become special representative of the Blaw-Knox Co., Pittsburgh. He will make his headquarters in the executive offices at Pittsburgh.

Mr. Bakewell was graduated from Yale University in 1908 and had two years post graduate work at Massachusetts Institute of Technology, after which he became a special apprentice for the Pennsylvania Railroad at Altoona, Pa. From 1911 to 1917 he was connected with the Duquesne Steel Foundry Co. as machinist, tool-maker, assistant superintendent, assistant secretary, and secretary. In 1917 he was made president of this company and served in that capacity until the merger with Continental Roll & Steel Foundry Co. in 1930.

Mr. Bakewell is vice-president and member of the executive committee of the Illinois Zinc Co., director of E. H. Jennings Brothers Co., member of American Iron and Steel Institute, member of the ad-



T. E. HUGHES



GEORGE E. HOPF



F. E. BARTH



visory committee of the American Foundrymen's Association, and director and member of the executive committee of the Steel Founders Society of America.

♦ ♦ ♦

RAY M. CALKINS, of Chicago, has been elected president of Steel Buildings, Inc., Middletown, Ohio. JAMES W. SWANK has been elected vice-president. Several years ago Mr. Calkins and Mr. Swank invented and developed the Steelox method of construction used by Steel Buildings, Inc., in the construction of its homes. Both men have spent many years in the construction industry. GILBERT R. EICHELBERGER, of Dayton, Ohio, who has been one of the leading distributors of Steelox homes, has been appointed general sales manager.



D. C. BAKEWELL

HARVEY T. HARRISON, for several years in charge of sales in the Cleveland territory for the Duraloy Co., Scottsdale, Pa., has been made sales manager of the company.

♦ ♦ ♦

B. C. HEACOCK, president, Caterpillar Tractor Co., Peoria, Ill., and WILLIAM C. DICKERMAN, president, American Locomotive Co., New York, have been elected members of the board of the Chamber of Commerce of the United States.

♦ ♦ ♦

LOUIS E. PECK, formerly with the United States Tool Co., Inc., Ampere, N. J., has been placed in charge of the press department of the Thomas Spacing Maching Co., Pittsburgh.

♦ ♦ ♦

ELMER J. KOPF, since 1933 manager of advertising and sales promotion of the Union Drawn Steel Co., Massillon, Ohio, has joined



*Using*  
**CHACE**  
*Thermostatic* **BIMETAL**

Look at America's finest ranges and you will find them equipped with Cooper Oven Thermometer, noted for accuracy and reliability.

If your product calls for automatic action at change in temperature, or yours is a problem of automatically controlling temperature, Chace Thermostatic Bimetal may be your solution.

Sold in sheets, in strips, and shaped for assembly.

**COOPER**  
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THERMOSTATIC  
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*"It stands with the Heat"*

**W. M. CHACE CO.**  
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# WIRE

**THAT CARBURIZES  
FASTER...DEEPER**

The chromium in \*KONIK forms carbides which increase the speed and amount of carbon absorption... you can get a deeper case, or a specified case in less time or with lower temperature. Hardening, too, is deeper, more uniform, more dependable. For a better product at lower cost use this modern metal with patented ratios of copper, nickel, and chromium.

**CONTINENTAL STEEL CORP.**

General Offices: Kokomo, Indiana  
Plants at Canton, Kokomo, Indianapolis



**KONIK**  
**STEEL**

CONTAINING COPPER, NICKEL AND CHROMIUM

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**CONTINENTAL**  
STEEL SHEETS AND WIRE PRODUCTS

Wire: Bright Basic, Annealed, \*Konik, Special Manufacturers, Galvanized, \*Flame-Sealed  
Wire Rods, Nails, Staples, Bale Ties, Barbed Wire, Fence—15 Types; Gates and Fittings  
Sheets: Black, Galvanized, Special Coated; Roofing and Siding—14 Styles

\*Trade Mark Registered, U. S. Patent Office

the staff of the advertising division, Republic Steel Corp., Cleveland.



R. C. REICHEL is the new general sales manager of the General Body Corp., Detroit, manufacturer of welded-steel passenger trailers. Mr. Reichel has been associated with Western Tube Co., Kewanee, Ill., a subsidiary plant of the United States Steel Corp., the old Chalmers Motor Car Co., Detroit, and the old Maxwell Motor Car Co.

When Chrysler Corp. came into being, Mr. Reichel became general service manager. He left Chrysler to become assistant to the president of the Falcon Motor Co. at Elyria, Ohio. Later he became general sales manager for the Jordan Motor Car Co., Cleveland.



J. E. FIELDS, who has been vice-president and director of the Chrysler Corp. and president of the Chrysler car division, assumes

more important executive responsibilities for the corporation as a whole at the general business offices in Highland Park, Mich. Mr. Fields, to whom no new title has been given, has been with Mr. Chrysler since 1923, previously having been in the machinery and cash register businesses and with Chalmers and Haynes automobile companies.

DAVID A. WALLACE succeeds Mr. Fields as president of the Chrysler division. Starting in 1929 as staff master mechanic in the office of K. T. Keller, then general manager, Mr. Wallace has been vice-president in charge of manufacturing in the Chrysler division, Jefferson-Kercheval plant, and president of the Marine engine division.



W. G. TUNIS has been appointed general manager of the transmission plant of the Chrysler-Dodge division at Kokomo, Ind. He has been with Dodge since 1915. He started as a toolmaker and has had many special assignments through the master mechanic's department.

RAY M. HIRST will be master mechanic of the Kokomo plant. He also comes from the Dodge division. Chrysler took over some of the property formerly owned by the Haynes Automobile Co. in Kokomo and will remodel and make extensions so that operations will start this fall at Kokomo. It is expected that 1500 to 2000 men will be employed.



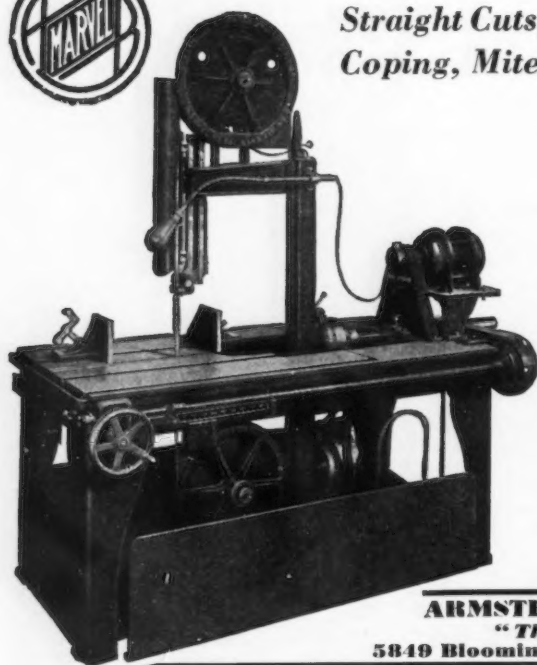
LOUIS B. NEUMILLER, former manager of the central sales division of the Caterpillar Tractor Co., has been named director of industrial relations, a new post created because of employment growth. L. J. FLETCHER, former head of the agricultural sales division, has been made assistant general sales manager.



ROBERT W. LAW, who has been identified with the New York office of the A. M. Byers Co., Pittsburgh, since 1925, has been appointed division manager of the company's Boston office, 518 Consolidated Building. He succeeds J. J. RILEY.



F. C. RITNER has been appointed assistant to the president, Carboloy Co., Inc., Detroit, and will be in charge of special wear resistant applications, new developments and special products. T. D. MACLAFERTY, formerly of the Detroit office of the General Electric Co.,



### Straight Cuts, Angle Cuts, Notching Coping, Mitering . . .

THE MARVEL No. 8 is the truly universal metal cutting saw, handling all work from  $\frac{1}{8}$ " x  $\frac{1}{4}$ " to 18" x 18". It is one of the most versatile multi-purpose saws built.

With its planer-type bed, hand and power feed, and swinging saw carriage that will feed the blade into the work at any angle from 45° right to 45° left, it gets in on every job to save labor and costly hours or to improve shop practice. It will save "warehouse cutting extras" on die plates. It will save hours of machining in roughing to form and shape. It will miter, notch, and cut off large work rapidly, or will nip off the smallest rod cleanly—will handle the heaviest job or the most delicate cut with equal efficiency. You will see them everywhere, and wherever you see one, it's the busiest machine in the shop.

**ARMSTRONG-BLUM MFG. CO.**

*"The Hack Saw People"*

5849 Bloomingdale Ave., Chicago, U. S. A.



**BOLTS  
NUTS  
SCREWS  
& RIVETS**



Quality, Accuracy, Uniformity,  
Service and Deliveries that give  
you Bolt Satisfaction.

**CLARK BROS BOLT CO.**

MILLDALE, CONN.

STANDARDS AND

SPECIALS

has been appointed to the general sales office as assistant to Mr. BEARDSLEE, general sales manager. H. C. STONE, heretofore of the Newark, N. J., office, will represent the Carboly Co. in New York.

♦ ♦ ♦

PETER A. VUKMANIC, a graduate student at Carnegie Institute of Technology, has been awarded the Robert Tillman Memorial Graduate



**WILLIAM G. HULBERT**, whose appointment as vice-president of the Taylor-Wharton Iron & Steel Co., High Bridge, N. J., was announced in these columns last week.

Fellowship in metallurgy. The fellowship was established several months ago by LAMBERT J., JOSEPH L., and RAYMOND L. TILLMAN, in behalf of the Industrial Steel Casting Co., Toledo, as a memorial to their brother, Robert B. Tillman.

♦ ♦ ♦

HENRY R. HORTENSTEINE has been elected president of the Hunter Steel Co., Pittsburgh. Mr. Hortensteine has been with the Hunter Steel Co., formerly the Independent Bridge Co., for 21 years in the capacity of vice-president and chief engineer. He is a graduate of the Virginia Polytechnic Institute and was an employee of the Penn Bridge Co., Beaver Falls, Pa., before he became connected with Hunter Steel.

♦ ♦ ♦

PAUL A. SMITH has been appointed vice-president and general manager of the Hunter Steel Co. Mr. Smith was graduated from the West Virginia University 13 years ago, at which time he entered the employ of the Hunter Steel Co. For the past five years he has been vice-president and field engineer.

## Blaw-Knox Division Sold to Pangborn

THE Blaw-Knox Co., Blawnox, Pa., has sold its dust collecting division as of June 17, 1937, to Pangborn Corp., Hagerstown, Md. Patents, drawings, and good will of the division are also taken over by

the Pangborn Corp., leading manufacturer of dust control and blast cleaning equipment, which has had over 30 years' experience devoted exclusively to this field.

The Blaw-Knox Co. will continue to manufacture and market Blaw-Knox devices for the cleaning of liquids and gases, this type of equipment not being included in the sale.

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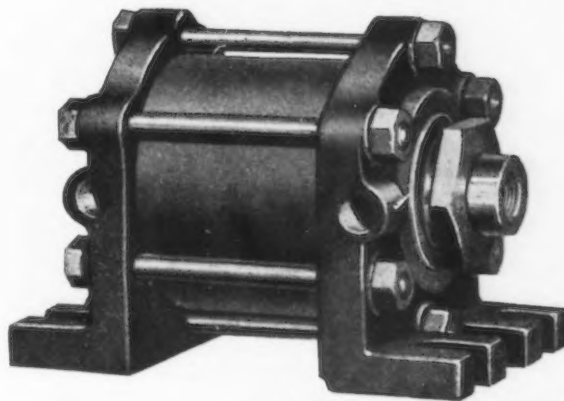
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# *Martial Law Ordered in Mahoning Valley By Ohio Governor as Mills Plan to Reopen; President Roosevelt Backs CIO in Strike*

By JAMES A. ROWAN

**Y**OUNGSTOWN, June 22. —Governor Martin L. Davey today checked a back-to-work movement of Youngstown Sheet & Tube Co. and Republic Steel Corp. workers by ordering 4800 Ohio National Guardsmen into the Mahoning Valley. The guardsmen were instructed by Governor Davey, with approval of President Roosevelt, to prevent the steel plants from re-opening pending the conclusion of strike mediation proceedings being conducted at Cleveland by a Federal board appointed by Secretary of Labor Frances Perkins.

After Governor Davey's six-troop mobilization order, which came only seven hours before strike-bound plants of the two companies were scheduled to be thrown open, the concern's executives announced no attempt would be made to operate. The Sheet & Tube management said:

"We deeply regret this apparent breakdown of law enforcement in our midst. We do not attempt to explain it. We were, and are, ready to provide work for such of our employees as desire to return to work. The responsibility for refusing admission to our plants for these citizens and taxpayers to resume work must rest upon the State of Ohio and not upon the company.

"We request that the Governor of Ohio inform the citizens of this valley when the State will resume its lawful functions, repel invaders and permit its citizens to take up their regular tasks of supporting themselves and their families."

## **Might Have Broken Strike**

Regarded as a move which might, if successful, upset the Steel Workers Organizing Committee's grip on steel labor and undermine the nation-wide program of the Committee for Industrial Organization, the planned reopening of

the plants drew the attention of the nation to this city.

Approximately 32,000 men have been idle in the Mahoning Valley alone since plants of Republic Steel Corp. and Youngstown Sheet & Tube were closed May 26. To date the payroll loss due to the strike is estimated at about \$5,000,000 for Youngstown plants and \$15,000,000 for all plants involved, including those of Inland Steel Co., Chicago, and Bethlehem Steel Corp. At Johnstown, Pa., approximately 90,000 men are idle in closed plants of the four big independent steel companies involved in strikes.

To end the loss of additional millions of dollars in payrolls, Frank Purnell, president of Sheet & Tube, announced Monday that his company had decided to reopen its plants. Simultaneously Republic Steel Corp. announced its closed Youngstown plants would be re-opened.

## **Employees Asked Reopening**

Mr. Purnell described the reasons for the re-opening in the following letter to employees:

"A committee of employees recently presented to the company petitions bearing numerous signatures (approximately 9000) requesting that the plants of the company be re-opened and that the employees be permitted to return to work. In addition, a great many employees have communicated to me and other officers of the company personally and by telephone, telegraph and letter this same request.

"I replied that the matter involved very serious problems and that I was not willing to expose the employees of the company to violence which might involve injury to any of them. I requested time to investigate the situation and determine whether the law en-

forcement authorities in the cities and the counties wherein our plants are located were willing and able to protect employees of the company in the exercise of their legal right to work.

"As long ago as April 29, 1937, representatives of the company met representatives of the CIO for purposes of collective bargaining, and our representatives made an effort to negotiate with the CIO representatives with respect to wages, hours of work, vacations and procedure for adjusting grievances in behalf of any employees of this company who were members of the CIO.

"The CIO representatives adopted the arbitrary position that no agreement could be reached unless the company would sign a contract substantially in the form presented by them. At the conclusion of these negotiations the company representatives informed the CIO representatives that the company was unwilling to sign such an agreement with CIO and stated its reasons.

"Thereafter, on May 26, 1937, our employees were prevented from going to work by pickets of the CIO and the plants have been completely closed since that time. The company believes that only a small minority of its employees desired the strike to be called and that the great majority of its employees were opposed to any strike and desired to continue their work.

## **Pickets Are Not Employees**

"The company is informed that its employees have been kept from work by pickets composed in part of men who are not employees of the company and are not citizens or residents of the cities or counties wherein our plants are located.

"Last week and the week before representatives of the company met

with the Governor of Ohio at his request, and there were present representatives of the CIO. The company reiterated its opposition to signing an agreement and repeated its reasons for its position. The company's decision in this respect has not changed.

"Threats and intimidation have been employed for many months to compel employees of this company to join the CIO organization, and threats, vandalism and terrorism have forced the company to close its plants in order not to expose its employees to injury from violence.

"The law enforcement officers of the cities of Youngstown, Campbell, Struthers and Hubbard and the sheriff of Mahoning County have stated to me that they are willing and now are prepared and able to protect the company's employees in their lawful right to resume work.

"This right is guaranteed them by the Constitution of the United States and the Constitution of Ohio, but has been interfered with by groups of persons, led and made up in part by those who are not employees of the company. As the public officials are now in a position to afford protection to our employees and their families, we feel it is the company's duty to provide work for its employees as long as it has work for them. Work is available and for the reasons stated we now advise you that we will proceed with arrangements to open our plants, so that you, our employees, may resume work at the earliest possible date. You will be duly notified of the date of resumption and other details concerning it. \* \* \*

#### Republic's Statement

Furthering its opposition to the request by the Federal Government that it refrain from attempting to re-open its plants the Republic Steel Corp. said: "To maintain the 'status quo' would place an unwarranted and impossible burden upon these men and their families. The men desiring to work should be given protection to enable them to return to their jobs now and not after additional weeks of involuntary idleness while the investigation is in progress.

"As a result of the lawless, defiant and illegal picketing methods of the CIO the fundamental issue in this controversy today is whether or not American citizens are to be free to work when and where they choose unmolested.

"In this respect Republic's policy has not changed since the CIO strike began four weeks ago. The company's stand continues to be that plants will be reopened as rapidly as civil authority will give

assurance that employees can safely go to and from their jobs."

#### Threatens Sit-downs

Another highlight in the fourth week of the strike was a significant statement by John Owens, CIO director for Ohio and leader of the strike in the Mahoning Valley. He said:

"If these steel leaders continue in advocating that the men return to work without a signed contract a sit-down strike in all these mills is inevitable. We are reliably informed that among these back-to-work groups our people are discussing returning to work and sitting down on the job. I refer to persons sympathetic to the union.

"There are men in this valley who have taken a position that they are not going to permit anybody to take their jobs, and, if need be, they are going to go in and sit-down instead of striking on the outside.

"We are trying to conduct this strike in an honorable and peaceable manner. If this sit-down strike develops Tom Girdler and Frank Purnell cannot blame anyone else but themselves and their executive associates.

"Our people take the attitude that they are in a fight for their economic liberty, and social security and constitutional rights."

#### Strike Violence

Subsequent to Sheet & Tube's announcement, which was accompanied by a similar statement to employees from Republic Steel Corp., Youngstown and the Mahoning Valley saw a week of violence and a riot in which two strike pickets were killed, a score of strikers, deputies and bystanders injured and scores chased by tear gas barrages.

Throughout the past week, the fourth of the strike, executives of the affected steel companies stood firm in their contention that they would not sign contracts with the CIO.

#### Government Support for CIO

The steel concerns involved in a struggle with the CIO fought hard this week and last to win against what seemed tremendous odds. Both Federal and State Government tossed its support to the Lewis union. Showing the CIO concern over the outcome of the present struggle in this and other steel communities, Clinton S. Golden, SWOC regional director for the Pittsburgh area, said here Sunday:

"The entire labor movement of the United States will throw its influence behind you workers in the Mahoning Valley."

Mr. Golden likewise advised a mass meeting at Struthers, that "workers in this country could profit from using some of the methods used by workers' groups in other countries."

An outstanding development this last week in the seven-state strike was the appointment by Secretary of Labor Frances Perkins of a three-man arbitration board to settle the strike. Members of the board, now meeting at Cleveland, Ohio, are Charles P. Taft, son of the former President and now an attorney for the Amalgamated Clothing Workers, a CIO union; Lloyd K. Garrison, Wisconsin Law School dean, formerly chairman of the National Labor Relations Board, and Assistant Secretary of Labor Edward McGrady.

At the outset both Republic and Sheet & Tube refused to follow instructions from Secretary Perkins, Governor Martin L. Davey of Ohio and others that the "status quo" be maintained until the Steel Mediation Board had an opportunity to function. Members of the board likewise requested maintenance of the "status quo," which meant giving up any attempts to reopen the closed mills.

#### Board Members "Biased"

Members of the board are on record as favorable to signed agreements between employees and employers, the sole issue in the present steel strike. Steel officials have discovered that in Mr. Taft's book, *You and I and Roosevelt*, the son of the former President wrote, "Fuel is sometimes added to the flames by the silly refusal of employers to put such agreement as they may reach in writing. No position has so little justification."

They also discovered that in February, 1937, Mr. Garrison wrote in the *Yale Law Journal* that: "The history of the railroad industry seems to demonstrate that the establishment and maintenance of satisfactory relations between labor and managements depends on the following factors . . . the frank acceptance of collective bargaining, which means the making of honest efforts to regularize by agreement wages, hours and working conditions; the reduction of those agreements to writing."

Since Mr. McGrady's position on signed agreements is also well known, the steel producers were advised that the Steel Mediation Board was another case of "packing."

# Congressman Hoffman Introduces Bill Barring Importation of Strikebreakers

WASHINGTON, June 22.—A bitter opponent of John L. Lewis and his CIO, Representative Clare E. Hoffman of Michigan yesterday introduced a bill which would bar interstate importation of "any person for the purpose of closing a plant engaged in production of goods which are shipped in interstate commerce." A reflection of resentment that the Cambria plant of the Bethlehem Steel Co. at Johnstown, which had been closed despite the desire of an overwhelming majority of its employees to return to work, the Hoffman bill was offered as an amendment barring the importation of strikebreakers.

Hoffman said that "Madam Perkins intends to increase unemployment by assisting, either directly or indirectly, in the closing of industrial plants for the sole reason that the management refuses to sign a contract with labor organizations. It will be necessary for Congress to increase the relief appropriation and that Congress should have this information so as to enable it to pass intelligently, if that be possible, upon the amount actually needed to meet future relief rolls, augmented as they will be by the 14,000 workers in the Johnstown area and the steel workers in other districts."

Mr. Hoffman said it would, of course, also be well to be advised of the number who are to be thrown out of employment "if and when John L. Lewis calls his sympathetic coal mine and ore strikes and if and when Homer Martin makes good his threat to stop production in the motor industry."

"The President," said Hoffman, "was unable to pack the Supreme Court but, through his Secretary of Labor, he has apparently succeeded in packing the Strike Mediation Board so that his friend, John L. Lewis, will be sure of the decision he desired if the question is asked as to whether Republic should sign a contract."

## Real Issue the Right to Work

"The real issue that the Mediation Board should consider is whether, in the United States and each of the 48 States thereof, a man who wants to work shall have the privilege. The right has been taken from him."

Responding to a CIO complaint

filed with the Secretary of the Treasury, Elmer Irey, chief of the Intelligence Unit of the Bureau of Internal Revenue, yesterday gave authority to the Cleveland office of the bureau to investigate charges that two steel companies were violating the National Firearms act. Making every move possible to arrest steel companies the CIO has added this to numerous other charges directed against strikes affecting steel companies and alleges that the Republic Steel Co. and the Youngstown Sheet & Tube Co. have stocks of firearms and explosives in their plants.

Meanwhile Representative Allen T. Treadway, Republican of Massachusetts, told the House that the Administration was condoning

the strike activities of John L. Lewis' CIO activities.

"It is even said that the head of the CIO has demanded support of the Administration as remittance for a \$500,000 contribution to the last Democratic campaign fund," said Treadway.

Treadway said that the present attitude is an indication of socialism, communism leanings of the Administration and pointed out that it is a further indictment against the Administration by indicating a move toward one man control in Washington.

## Government Has Surrendered

Rising on the House floor yesterday, Representative Eugene E. Cox, Democrat of Georgia, bitterly struck at the present sweep of CIO strikes as the "most cowardly exhibition in history." The Government, Cox said, has "surrendered its prerogatives to a handful of lawless people." An end to the present wave of terrorism was demanded by the Georgia Representative.

# Cambria Plant Closed by Governor Though 70% of Men Want to Work

PITTSBURGH, June 22.—Despite the estimate of unofficial but reliable sources that nearly 70 per cent of the total employees were willing to go back to work, Bethlehem Steel Co.'s Cambria works at Johnstown were shut down under protest by the Governor of Pennsylvania yesterday, when his order for a "modified martial law" became effective. State police took over the picket line, refusing entrance to all but maintenance men who were to take care of equipment.

Members of the Steel Workers Organizing Committee, estimated that less than 3000 out of a total of 12,000 to 15,000 employees, have been on strike for 12 days, but plant operations, although slightly curtailed, had been maintained up to the time of the martial law edict.

The company had planned to open the gates yesterday so that all those desiring to work could return. However, the SWOC had called a mass meeting of miners to help bolster up their strike. According to state and county officials, it was this move and the fear of violence which brought

about the forcible closing. However, after martial law had been declared the "sympathetic" mass meeting of miners was called off.

In submitting to the shutdown, C. R. Ellicott, general manager of the Cambria works, in a letter to the State's military governor of the county, said: "I hereby notify you that we submit to the order of Governor Earle. We do so, however, only under duress and by reason of the action taken by you . . . and we reserve all rights and remedies which we may have to any manner of relief against enforcement of said order and for any damages which we may suffer by reason thereof."

The strike which was called over the non-signing of a union contract is expected to be taken up by the new Federal Mediation Board. The Governor of Pennsylvania has given no intimation as to when the modified martial law ban will be lifted. Meanwhile, the closing of the plant, according to business men and merchants, who were opposed to the move, has seriously affected business in the steel community which is rapidly approaching depression levels.



# Inland Men Want to Resume Work; Company Answers NLRB Complaint

CHICAGO, June 22.—The Inland Steel Co. will be approached in the near future by a delegation from the Steel Workers Independent Union, Inc., which claims to represent a majority of that company's unionized labor, and requested to open its plants, according to a union spokesman. Maurice E. Crites, attorney for the union, stated that the members of the group did not want to go out on strike, that they had no interest in it other than that it was costing them money, and that their one desire was to return to work as quickly as possible. He estimated that fully 75 per cent of the more than 13,000 employees at Indiana Harbor would go back to work immediately if proper protection and encouragement were given them by the authorities. Incorporated under Indiana laws, the union's membership includes no foremen or superintendents, and is headed by Daniel McDevitt, an Inland worker. An Inland official in commenting on the independent union's prospective move, said that the strike which is now entering its 27th day and the absence of paychecks are naturally causing the men to become desperate and that such action was expected by the company.

The answer to the complaint made by the SWOC to the National Labor Relations Board was filed and made public here this week. The company points out in its answer that "the SWOC and no one else caused the strike. Its representatives forced certain of the company's employees in its Indiana Harbor and Chicago Heights plants to go out on strike on May 26, 1937, and as a result the rest of the company's employees were prevented from working and in order to avoid risk to lives and property the company shut down the plants. This strike was wholly unwarranted and without just cause and was not in the interest either of the employees who were caused to participate therein or of the others who were prevented from working, but was contrary to their interest in that it deprived them of large amounts of wages, which were available to them at rates and hours and upon conditions wholly satisfactory to them and to the SWOC. These wages would have been received by the employees throughout the period of the strike and they would now be receiving them if the strike had not been called by the SWOC."

## Inland Cites Reasons for Refusing to Sign

The company further points out that it has been willing at all times to bargain with the SWOC concerning wages, hours and working conditions, but that the SWOC had expressed itself as being satisfied and made the one demand of "a yes-and-no answer to the single question whether it (the company) would sign a contract." In refusing to sign a contract, Inland lists eight reasons for its actions, which are as follows:

- (a) *A signed contract with the SWOC would be used to coerce the company's employees to join that organization by making them believe that they must do so to hold their jobs.*
- (b) *A signed contract with the SWOC would lead to its announced objective of the closed shop, which would deprive the individual worker of a free choice in labor representation and be contrary to the best interests of the company, its employees, and the public.*
- (c) *A signed contract with the SWOC would lead to its second announced objective, the check-off system, which would compel payroll deductions from a worker against his will, and which would be unfair, arbitrary and oppressive.*
- (d) *Signed contracts with CIO affiliates have not brought about industrial peace.*
- (e) *Signed contracts with CIO affiliates have undermined employee morale and impaired plant efficiency.*
- (f) *The SWOC is not a responsible party, and signed contracts with CIO affiliates have not prevented sporadic strikes and sit-downs.*
- (g) *A signed contract is not necessary to avoid misunderstanding with respect to wages, hours and working conditions.*
- (h) *A signed contract is not required by the National Labor Relations Act.*

The hearing of Inland before the National Labor Relations Board will be held in the Chicago regional office, June 25, to deter-

mine whether that company has engaged in the unfair labor practices complained of by the SWOC.

The situation at the Republic Steel Corp.'s South Chicago plant becomes more normal daily. Men are constantly returning to work from the outside, and large numbers go to and from their work and homes as they ordinarily do, with no interference and no danger. Wire and nails are being produced in the wire mill now, although some alterations are being made in the warehouse in order to make the location legally habitable for employees in case it becomes necessary to house workers there once more. The Pullman cars in the yards are still being used as sleeping quarters for those men who remain in the plant at night.

The Progressive Steel Workers Union, an independent group, was recognized last week by the Wisconsin Steel Co. as sole bargaining agency for its employees. This move was made following an investigation by an independent accounting firm of employee union membership cards which show that 3020, or 75 per cent of the 4001 employees in the plant belong to the independent union as opposed to the SWOC. No written contract is to be asked by this independent group, but negotiations as to wages, hours and working conditions will be carried out in the usual manner. This union is not affiliated with the CIO in any way whatsoever.

## Men Running Out of Funds

Conditions here, quiet on the surface are, nevertheless, tense underneath, as workers forced from their jobs by the strike find their funds sinking lower and lower with no bank accounts to fall back upon. Many have bought furniture and other household goods on the installment plan, and are likely to be faced with the unpleasant prospect of having to default on their payments. Others have bills from the doctor, dentist, butcher and grocery, and with no reserve funds and no bi-monthly pay check coming in, their debts are increasing rapidly. Still more need cash for payments upon homes and automobiles. Relief agencies are available, but self-respecting workers disdain this aid and would stoop to it only when practically penniless.

SUMMARIES compiled from the returns of the recent Biennial Census of Manufacturers, covering the year 1935 as compared with 1933, have been released by the United States Bureau of the Census, and may be secured by interested persons by writing the bureau in Washington.

## Text of Statement Issued by Federal Steel Mediation Board

CLEVELAND, June 22.—The Federal Steel Strike Mediation Board issued this statement Monday night:

"We met Monday morning with the union representatives. We discussed with them the question of the terms of the Carnegie-Illinois agreement in an effort to determine just what the issues were, if any, between the union and the companies.

"They stated positively and un-

equivocally that all of the companies had agreed that there was no dispute about any term of the Carnegie-Illinois agreement except that one company had a different rate for common labor. The sole question was whether or not a written agreement should be signed.

"We then proposed certain possible methods of recording an agreement. The union took these proposals under advisement. The meeting with the union represen-

tatives then adjourned to be reconvened on call.

"At 12 noon we met with the employers.

"1. We stated at the start that we felt we were beginning under great difficulties because of the orders for opening certain plants at a definite time Tuesday morning in spite of our requests expressed Saturday that the status quo be maintained. We asked that this order be withdrawn at least until we could see what progress could be made, since we were advised that its execution meant certain bloodshed.

### Reply of Companies

"The companies involved, Youngstown and Republic, stated they did not feel, in justice to their employees who wish to return to work, that they could delay any longer, in view of the assurance to them of adequate law enforcement.

"2. We then asked the companies whether at this time there was any term of the Carnegie-Illinois agreement which was not agreeable to them.

"Each of the companies stated that there were terms in the Carnegie-Illinois agreement to which they did not and would not agree under any circumstances, and gave us specific examples of such terms.

"3. We then proposed various ways by which an understanding reached by collective bargaining could be recorded.

The companies questioned all of our proposals as to ways of recording an agreement if reached and all took the position that they would not under present circumstances enter into agreements, written or oral, with the SWOC.

"4. We then asked the heads of the companies to meet with the representatives of the union in order to explore the possibility of settling the strike.

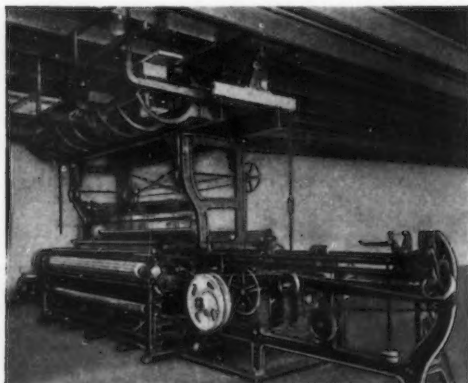
### Offer Meeting With Union

"The heads of the four companies, for different reasons, said that they would not meet with the union representatives now. They said that they would have fully authorized representatives meet, each company separately, with the union officials or any of them as the representative of their members and with the board at any convenient time and place, the time and place to be arranged on Tuesday. They said, however, that they would refuse to discuss at such meetings the making or signing of a contract.

"The board then met with the union representatives and informed them of the situation. They stated



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that in view of the last reservation they did not believe that such meetings would have any value.

"The heads of the companies offered to meet with the board again at any convenient time and place.

"We feel on the basis of our lat-

est advices that the plants may not attempt to open Tuesday morning. In view of this fact and the possibility of further conferences on Wednesday looking toward a settlement, we are making no further comment on the situation at this time."

## Gray Iron Founders Hold Their Annual Meeting in Cleveland

**G**RAY iron foundrymen journeyed to Cleveland recently for the ninth annual convention of the Gray Iron Founders' Society, held at the Hotel Cleveland on June 11 and 12. Business of the convention was crowded into one day. On Saturday, June 12, designated as Gray Iron Founders' Day at the Great Lakes Exposition, the visitors were treated to a tour of the exposition.

The meeting was called to order by Peter E. Rentschler, president of the society.

### OFFICERS FOR THE COMING YEAR WERE CHOSEN AS FOLLOWS:

**President**—Peter E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, Ohio.

**Vice-President**—R. E. Kucher, vice-president, Olympic Foundry Co., Seattle, Wash.

**Secretary**—J. H. Pohlman, vice-president, Pohlman Foundry Co., Inc., Buffalo.

**Treasurer**—W. L. Seelbach, secretary-treasurer, Forest City Foundries Co., Cleveland.

The demand for gray iron castings will not increase until foundries, acting alone or as a group, succeed in developing new fields of service for this product, according to L. J. Wischerath, advertising manager, Buffalo Foundry & Machine Co., Buffalo. Gray iron analyses today differ with those of some years ago which are usually described in school and engineering textbooks. For this reason, foundrymen should reeducate prospective users, acquainting them with the new and latest properties of cast gray iron.

Attacking the problem of depreciation and obsolescence, Paul T. Norton, Jr., professor of industrial engineering, Virginia Polytechnic Institute, declared that "the problem of depreciation and obsolescence has been left almost entirely in the

hands of the accountants instead of being recognized as a management problem which requires the attention of general management and also of the engineering department if it is to be solved satisfactorily."

The speaker cited two new factors affecting the problem today: legislation of the corporation surplus tax, tending to drive profits into dividends and preventing retention of funds for machinery replacements; and the rise in standards of perfection of products and services, placing greater demands on plant and equipment. In order to meet competition today, equipment must be adequate, it was stated.

Obsolescence in modern industry was declared to be more important than wear and tear. "There is a

greater economy in scrapping than in wearing out," Mr. Norton concluded.

Whiting Williams, labor authority, told his listeners that the current CIO strikes in the steel and automotive industries were being taken too seriously. He divided workers into three groups: 20 per cent composed of young, inexperienced men, with radical leanings, who were pro-union; 20 per cent composed of older workers, who were pro-company; and 60 per cent, composing a group neither pro-union nor pro-company, but pro-job.

The 60 per cent are shifting and variable, changing their minds from day to day relative to the promises of union or company, but their real interest lies in attaining maximum satisfaction from the job.

Mr. Williams described the CIO as a "hard times union," equipped to say to the workmen, "I will protect you against unjust loss of your job." Once the worker's confidence about his job is restored, he loses interest in the union and dislikes having to pay dues.

Respecting the steel strikes, Mr. Williams said, "I agree with Tom Girdler that the CIO agreements today mean very little to the union unless ultimately it can get the closed shop."

## No Action Yet on Scrap Licensing Bill

**W**ASHINGTON, June 22.—No further action has been taken on the Schwellenbach-Koppelman scrap licensing bill since the appointment of a five-member subcommittee headed by Senator Thomas, Democrat, of Utah. Other members of the subcommittee are Senators Johnson, Democrat, of Colorado; Schwartz, Democrat, of Wyoming; Bridges, Republican, of New Hampshire; and Lodge, Republican, of Massachusetts. This committee has held no formal meetings and has made no plans as to when hearings, if any, would be held or what witnesses would be called.

Conflicting with the recommendation of the Inter-departmental Committee that the measure be not enacted, Secretary of the Navy Swanson has filed a report with the House and Senate Committees on Military Affairs favoring enactment of the Schwellenbach-Koppelman scrap licensing bill after broadening its scope to include all iron and steel scrap. As the bill now stands it is limited to

steel plate scrap. It is understood that the War Department also is favorable to passage of the bill. The Secretaries of Navy and War are members of the Inter-departmental Committee, which is headed by Secretary of State Hull.

Representative Koppelman told THE IRON AGE that he proposes to act soon and have the bill broadened so as to include additional products for export licensing. He indicated he would include iron ore and pig iron and possibly other products.

## Battleships Awarded To Two Navy Yards

**W**ASHINGTON, June 22.—Assistant Secretary of the Navy today announced that the Government has awarded two new battleships to Government yards, one to the Philadelphia and the other to the New York Navy Yard. Private bids, which were submitted last week, were rejected because they were too high. President Roosevelt said that there was a difference of \$10,000,000 between the Navy estimates and the amount of the private bids.



# T. M. Girdler's Statement To Federal Steel Mediation Board

THE statement made by T. M. Girdler, chairman of the Republic Steel Corp., before the Steel Mediation Board on Monday was as follows:

"Republic Steel Corp. stands ready to present to this board the facts involved in the CIO strike against this company. It is our understanding that the order of Secretary of Labor Perkins appointing this board designated it as a fact-finding body.

"In appearing before the board to discuss the facts of the strike, Republic is not submitting the strike to arbitration by the board. Moreover, the company's appearance is not to be construed as requiring it to consent to any strike settlement plan which may be promulgated by this board.

"First of all we must make it clear that the fundamental issue in this strike is not one involving wages, hours or working conditions in Republic plants.

"The basic issue of the present strike is the right of American citizens to work free from molestation or violence and anger, and the right of the company to furnish employment to 58,000 men and women. It is therefore urged that the board do not lose sight of this fact in the conduct of its investigations.

## Bars Contract Issue

"It is therefore urged that the board do not lose sight of this fundamental issue by discussion of the technical question of a written contract between Republic and the CIO. There is not now, and never has been, any contract, oral or written, in existence between Republic and CIO.

"The facts are that the wages, hours and working conditions now in effect in Republic plants were established by the company before the proposed contract was presented by the CIO. Republic cannot and will not enter into a contract, oral or written, with an irresponsible party, and the CIO as presently constituted, is utterly irresponsible. Therefore, any discussion of this subject is futile.

"The company plants have been and are surrounded by armed crowds who call themselves pickets and who, by force and violence, keep employees in the plants from returning to their families when

their work is done, and other employees who want to go to work, from getting into the plants.

"In spite of the existing conditions of violence, some 23,000 of our employees are now at work.

"During the last few years a great deal has been said about the right of collective bargaining and the right to strike. Is there not an equal right in this country for free, American citizens who want to work, to do so, unmolested?

## Right to Strike Admitted

"The right of employees to call a strike and to engage in lawful picketing is undeniable. But it is another thing to have plants and employees picketed by men armed with clubs and guns, who, by show of force, keep the plants from operating.

"Republic Steel Corp. has always recognized the rights of employees under the law. It has paid the prevailing rate of wages in the industry and has operated its plants on eight-hour shifts. It has practiced collective bargaining and has not discriminated against employ-

ees by reason of membership or lack of membership in any organization. This policy will continue.

"The suggestion has been made by Secretary of Labor Perkins that operations be kept at 'status quo.' This would mean that thousands of employees who want to return to their jobs would not be permitted to do so. This company cannot, and will not, be a party to any such arrangement.

"Nearly four weeks of idleness have already deprived employees of Republic of more than \$3,000,000 in wages. For them to continue this idleness during the deliberations of this board would be to place an intolerable burden upon the families of these men, dependent upon them for a livelihood.

"The company stands on its right to operate its plant and to offer employment to thousands of willing workers who want to return to their jobs. The position of the company has been and is that its plants will be reopened as rapidly as civil authorities will give assurance that employees can go safely to and from their jobs.

"The distinguished members of this board will make a lasting contribution to peaceful relationship between labor and industry and to the maintenance of industrial peace by careful examination and impartial presentation of all facts and by a full report of it to the public."



*... New business in good volume, but not much forward contracting.*

TORONTO, June 22.—New business continues in good volume in the Canadian iron and steel markets, with demand almost entirely confined to spot delivery. Inquiries for third quarter are appearing and producers now are booking contracts, but so far these have been somewhat limited. It is expected, however, that there will be a large number of commitments made during the next week or 10 days. Producers do not look for further price changes in the immediate future. Delivery has some bearing on the situation, and it is stated that in sheets and bars mills are from a month to six weeks behind, with plants operating at full time. Mills are working on rail

contracts closed earlier in the year and rolling stock makers are operating at full time on old contracts. Other branches of the steel industry also are maintaining almost capacity rates. Demand for machinery and tools also continues in good volume with many concerns engaged in replacements of obsolete or worn out equipment.

Pig iron melters are showing interest in spot needs and some are now placing contracts for third quarter, while others are issuing inquiries. Production of pig iron shows little change, about 60 per cent of total capacity. Imports are light, mostly from the United States. Prices are firm and unchanged.

With the exception of increasing supplies of automobile scrap in Toronto and Montreal dealers' yards, there has been little change in the iron and steel scrap situation. Most iron and steel grades are in limited supply, although some consumers have good stocks on hand, while others are unable to obtain supplies for current needs and as a consequence are using larger tonnages of pig iron. Scrap prices are unchanged.

## RAILROAD BUYING

United States Sugar Corp. has ordered 60 30-ton cane cars from Magor Car Corp.

Seaboard Air Line has ordered 200 50-ton auto cars from Pullman-Standard Car Mfg. Co.

Canadian National has placed an order for 10 mail and express cars with Canadian Car & Foundry Co.

Ministry of Railways, China, has placed 10 locomotives each with American Locomotive Co. and Baldwin Locomotive Works, and has issued new inquiry for 20 additional locomotives.

Owens-Illinois Glass Co. has ordered 50 hopper cars from General American Transportation Co.

Illinois Central will spend approximately \$22,000,000 this year for improvements in track and equipment, according to L. A. Downs, president of the railroad. \$10,750,000 will be spent for new rolling stock, most of which has been ordered, and over \$11,000,000 will be used for improvements in track and rail bed.

### RAILS AND TRACK SUPPLY

Seaboard Air Line has ordered 10,000 tons of 100-lb. rails and fastenings from Tennessee Coal, Iron & Railroad Co., and Bethlehem Steel Corp.

## British Iron Output At 10-Year High

LONDON (*Special Correspondence*).—In spite of the Coronation and Whitsun holidays, the United Kingdom's output of pig iron in May amounted to 696,300 tons, 15,600 tons more than in the previous month and the highest total for exactly 10 years.

Steel production showed a slight falling off, but was still well above the 1,000,000-ton level.

## Black-Connery Bill May Not Be Passed

WASHINGTON, June 22.—The chances for passage of the Black-Connery wage-hour bill at this session of Congress are decreasing daily. Congressional sentiment for the bill, never strong, is cooling. Observers who, less than a week or two ago regarded its passage as "inevitable," now concede that the measure has only a 50-50 chance at best of passing, and that a definite trend against the measure is gaining momentum.

Growing resentment on Capitol Hill against Administration tactics, particularly the increasingly intense White House pressure, is cited as partially responsible for the trend. Coupled with that, of course,

is the determination on the part of most of the legislators to wind up the session as soon as possible to avoid Washington heat and to make ready for election battles many of them face next November.

Another indication of the trend in Washington is the departure of Vice-president Garner for his home in Texas and the apparently growing reluctance of Senate Majority Leader Robinson to go all the way down the line with Administration forces as has been his unflinching custom in the past.

## General Motors Cited By Trade Commission

WASHINGTON, June 22.—The Federal Trade Commission has issued a complaint against the General Motors Corp. and General Motors Sales Corp. charging unfair competition and practices tending to create monopoly in automobile parts, accessories, and supplies. Principal unfair practices alleged are the use of intimidation, oppression, and coercion to compel dealers handling General Motors cars,

against their will, to purchase parts, accessories, and supplies for use on such cars only from General Motors subsidiaries or affiliates. The respondents are alleged to have threatened dealers with cancellation of their franchises unless they accepted and paid for allegedly unneeded accessories and supplies and to have cancelled the franchises of certain dealers who refused to accept unneeded accessories and supplies.

The complaint charges violation of Section 5 of the Federal Trade Commission act prohibiting unfair competition and Section 3 of the Clayton act forbidding exclusive dealer contracts.

An all-day program has been arranged at Grand Detour, Ill., June 25, to commemorate the centennial of the beginning of the steel plow industry there. C. L. Christensen, dean of the University of Wisconsin college of agriculture, will speak at the dedication of a memorial to Major Leonard Andrus, founder of Grand Detour and a former partner of John Deere in the pioneering days of the steel plow.

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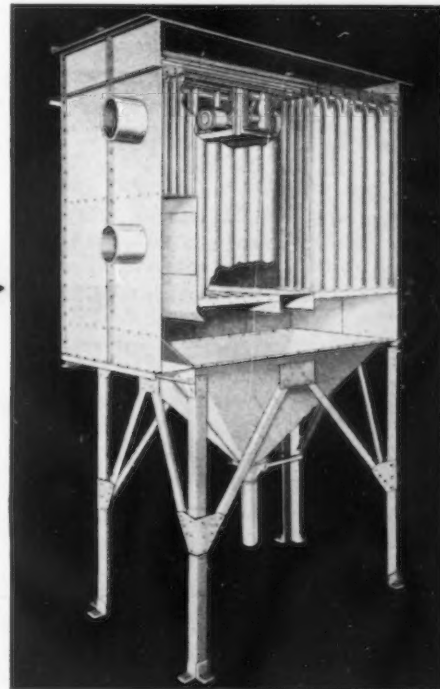


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American dustube Dust Collectors are widely used in foundries, mills, mines and industrial plants where dust creates a hazard that is health and profit-impairing and conducive to equipment deterioration as well.

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American Dust Collector Engineers are available to make a survey of your plant



without obligation and will submit recommendations on the size and type of dustube Dust Collector best suited to your needs.

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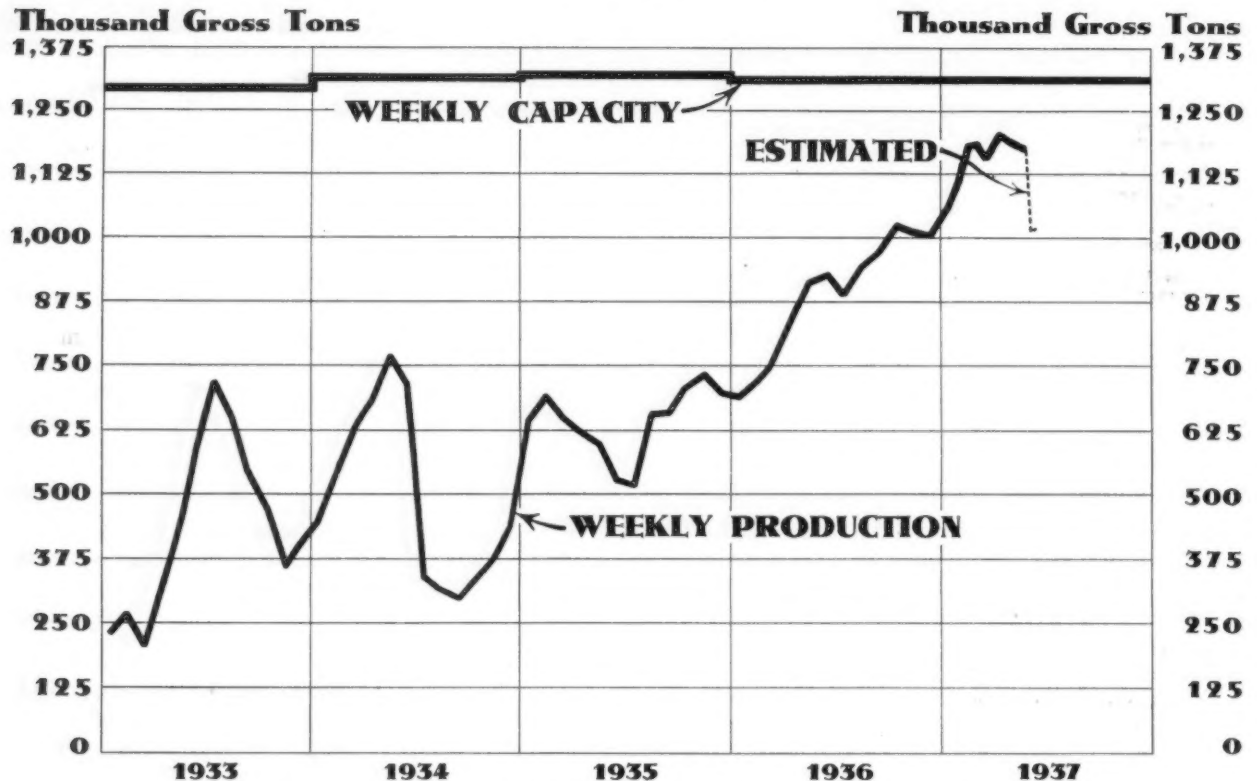


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# PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

## STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh .....	84.0	93.0
Chicago .....	64.0	64.0
Valleys .....	44.0	44.0
Philadelphia .....	68.0	69.0
Cleveland .....	58.0	56.0
Buffalo .....	83.0	95.5
Wheeling .....	99.0	100.0
Southern .....	74.0	71.5
Ohio River .....	88.0	92.5
Western .....	95.0	95.0
St. Louis .....	93.0	93.0
Detroit .....	100.0	100.0
Eastern .....	98.0	70.0
Aggregate .....	75.0	77.0

## Weekly Booking of Construction Steel

	June 22, 1937	June 15, 1937	Week Ended May 25, 1937	June 23, 1936	Year to Date 1937	1936
Fabricated structural steel awards.....	15,325	15,600	17,200	16,140	584,490	507,350
Fabricated plate awards.....	105	195	600	7,255	58,315	145,370
Steel sheet piling awards.....	3,820	430	345	3,075	35,555	20,840
Reinforcing bar awards.....	6,300	5,150	2,235	5,000	111,985	170,985
Total Lettings of Construction Steel....	25,550	21,375	20,380	31,470	790,345	844,545



## ...SUMMARY OF THE WEEK...

*... Volume of new business continues to dwindle despite restricted output.*

o o o

*... About 16 per cent of country's ingot producing capacity rendered idle by strikes.*

o o o

*... Automobile buying for new models expected soon if labor troubles end.*

**D**ESPITE the loss of steel production caused by strike shutdowns at various plants, the volume of new business being taken by companies not affected by strikes continues to dwindle, which may be partly due to seasonal factors and partly to the widespread loss of confidence occasioned by labor agitation, coupled with the breakdown in law enforcement, aided and abetted by the President of the United States and the Governors of the great steel-making States of Ohio and Pennsylvania.

With the closing down of the Johnstown plant of the Bethlehem Steel Corp. by order of Governor Earle of Pennsylvania and the postponement of the scheduled reopening of the Youngstown plants of Republic Steel Corp. and Youngstown Sheet & Tube Co., when martial law was declared in Mahoning Valley by Governor Davey of Ohio, the amount of steel ingot producing capacity that has been rendered idle by strikes is nearly 11,000,000 tons on an annual basis, or about 16 per cent of the country's total capacity. In addition, 90,000 steel workers are idle and total payroll losses to date are about \$15,000,000.

Labor anarchy with a Government guarantee places the strike-affected steel companies in a position from which there appears to be no way out that will be satisfactory to either side in the controversy. The efforts of the Federal Steel Mediation Board may come to naught in view of the resistance of the companies to signed agreements and the abrogation by Government edict of the Constitutional right to work.

**A**S the strikes enter their fifth week, and with hopes for a mutually satisfactory settlement as remote as ever, the volume of steel business being switched to companies not affected by strikes appears to be growing in volume, though it is not even now of large proportions, which is one indication that requirements of consumers, with some exceptions, are lessening.

The decline in new orders and reduction in backlogs find reflection in lowered operations at

some plants where labor troubles are not a factor. The average for the country this week is estimated at 75 per cent, down two points from last week. A part of this is caused by the complete shutdown at Johnstown, but there have also been declines at Buffalo and in southern Ohio, which are offset to some extent by increases in the Cleveland-Lorain and Birmingham districts. However, it is now apparent that further reduction in operations will occur soon unless business improves.

**C**HIEF hope for early business improvement lies in the plans of the automobile companies for work on new models, which has been interfered with to a considerable extent by the many strikes in that industry. If automobile companies are now successful in making a quick changeover to production of 1938 cars, volume purchases of steel will be made within two or three weeks.

In the new business of the past week the heavy products, particularly plates and shapes, have predominated, although there is also a growing demand for oil-country pipe owing to extensive drilling operations by oil companies. The farm machinery group is a consistently large user of steel. Tin plate shipments are at the limit of capacity. Deliveries of some steel products are shortening, but backlogs in sheets, plates and tin plate are very heavy.

**S**TRUCTURAL steel business shows a sizable amount for private construction. The week's lettings of more than 15,000 tons included 2100 tons for a General Motors plant at Rochester, N. Y., 3500 tons for a bridge at Turners Falls, Mass., and 1050 tons for the Bronx-Whitestone bridge, New York. New projects of size are 5000 tons for a General Motors plant at Trenton, N. J., 2200 tons for a Bendix Aviation Co. plant at Teterboro, N. J., 1900 tons for a rayon machinery plant at Painesville, Ohio, 1800 tons for an open hearth building for the Republic Steel Corp. at Alabama City, Ala., and 2000 tons for a bridge at Ottawa, Ill. Reinforcing bar awards were 6300 tons. The Seaboard Air Line has ordered 200 cars and 10,000 tons of rails. The Minister of Railways of China has bought 20 locomotives here and may buy 20 additional.

Iron ore movement on the Great Lakes is tapering owing to the relaxing of pressure by companies that are affected by strikes.

Pig iron buying is not brisk, but furnaces are booked almost solidly through the third quarter. For the first time since December, 1928, every serviceable blast furnace in Alabama is making iron, the Tennessee Coal, Iron & Railroad Co. having blown in its No. 6 stack at Ensley. The Sharon Steel Corp. has put into blast its Lowellville, Ohio, furnace, which has been idle since 1931.

The decline in steel scrap prices has been halted, temporarily, at least, though there will be no signs of strength until the steel strikes are settled.



## ...PITTSBURGH...

**...Shutdown of Cambria works reduces district operating rate to 84 per cent.**

o o o

**...Curtailed production among other plants likely if business continues to decline.**

o o o

**...Improvement in sheet orders, but other products are in much lighter demand.**

PITTSBURGH, June 22.—Operations in the Pittsburgh district, including the Johnstown area, are estimated at 84 per cent of capacity, down nine points from last week's figure which did not include the Johnstown district because of inability to gage production owing to strike difficulties. This week Bethlehem's Cambria works has been forcibly shut down on orders of the Governor of Pennsylvania despite the fact that reliable sources estimate the number of men willing to go back to work at close to 70 per cent. Ingot output in steel plants in the immediate Pittsburgh vicinity is unchanged from a week ago. The Wheeling district is off one point to 99 per cent of capacity. Resumption of ingot operations in the Johnstown area is indefinite and will probably hinge on the outcome of mediation efforts in other strike territories.

Meanwhile, incoming business in the past week is about on a par with the previous period. Sheet specifications have shown some improvement, most of which is attributable to a better flow of automobile orders. Some of these specifications are for rounding out 1937 programs, but a fair amount is to go into 1938 models. Miscellaneous sheet tonnage has also shown a slight upward trend, with the result that the leading producer has extended deliveries on practically all grades of sheets. Some sheet mills are able to give slightly better than average promises. Other steel products for which demand has shown improvement in the past week include structural plates and shapes and tubular goods. These items belong in the "heavy" class and are contributing considerable support to

the district's operating rate. Demand for hot rolled and cold finished bars and strip appears to be leveling off, although this condition will probably be reversed when automobile tonnages for new models reach the mills some time next month.

Steel backlogs in practically every case, with the exception of sheets, are easier. If the rate of new business does not increase soon, some producers will be forced to reduce operations from the present high levels which have existed for several months. This condition is more or less expected because of seasonal influences, but producers do not feel the letdown will be as great as was anticipated, if automobile companies are successful in their plans to make a quick change-over. Raw material markets are quiet and dull, reflecting instability because of labor disturbances.

### **Pig Iron**

The volume of incoming orders shows little change from a week ago. Shipments and production continue heavy. Customers whose source of supply has been cut off have dipped heavily into their inventories, as there has been little or no evidence of diversion of orders. Last week Sharon Steel Corp. blew in its Lowellsville, Ohio, blast furnace for the first time since 1931.

### **Semi-Finished Steel**

Semi-finished steel specifications in the past week are off some from the previous period, but compare favorably with the average tonnages booked in recent weeks. Total orders so far this month are running ahead of the corresponding period in May. Greatest de-

mand is for sheet and tin bars, although skelp continues to move briskly.

### **Bolts, Nuts and Rivets**

Producers are rapidly working down backlogs as shipments have been ahead of incoming business for several weeks. Orders in the past week show little change from the previous period and there is a good possibility that what little improvement has occurred is made up of orders from customers whose regular source of supply has been cut off. Distribution of new business is well diversified with some fill-in orders from automobile makers. Specifications covering 1938 models have not reached producers yet and are not expected much before next month.

### **Bars**

Total hot rolled bar orders show little change from a week ago, but the trend is toward a leveling off process due, in most cases, to seasonal influences. Orders are still emanating from a varied number of sources, with farm implement manufacturers continuing to specify freely. Some of the jobbing trade are taking a fair amount of steel as their stocks of certain sizes and grades have been depleted in recent weeks. Specifications covering 1938 models are expected next month.

### **Cold Finished Bars**

Volume of incoming business in the past week shows little change from the previous period. The tonnages involved are rather small. Deliveries are easier, with promises of three to four weeks or less being made on large tonnage items. The character of new bookings is still miscellaneous, with some jobbers in urgent need of popular sizes and grades. Motorcycle manufacturers have been in the market recently, as have been some automobile parts makers, presumably for material going into new models. Producers expect business to be light during the next few months, although automobile purchases expected some time in July will help bolster up otherwise dull order books.

### **Reinforcing Bars**

Quite a number of awards have been placed recently, although the tonnages involved for the most part are average, with the exception of 1320 tons awarded to Bethlehem Steel Corp. for the Bronx-White-stone bridge. New inquiries this week are light but the number of jobs in the offing preclude any sharp falling off in reinforcing bar specifications. Deliveries are easier and the condition of jobbers' inventories is spotty in that some ap-

# A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;  
Advances Over Past Week in Heavy Type, Declines in Italics

## Rails and Semi-finished Steel

Per Gross Ton:	June 22, 1937	June 15, 1937	May 25, 1937	June 23, 1936
Rails, heavy, at mill.....	\$42.50	\$42.50	\$42.50	\$36.37½
Light rails, Pittsburgh.....	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh..	37.00	37.00	37.00	28.00
Sheet bars, Pittsburgh.....	37.00	37.00	37.00	28.00
Slabs, Pittsburgh.....	37.00	37.00	37.00	28.00
Forging billets, Pittsburgh..	43.00	43.00	43.00	35.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	2.10	2.10	2.10	1.80

## Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	2.45	2.45	2.45	1.85
Bars, Chicago.....	2.50	2.50	2.50	1.90
Bars, Cleveland.....	2.50	2.50	2.50	1.90
Bars, New York.....	2.78	2.78	2.78	2.20
Plates, Pittsburgh.....	2.25	2.25	2.25	1.80
Plates, Chicago.....	2.30	2.30	2.30	1.85
Plates, New York.....	2.53	2.53	2.53	2.09
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.80
Structural shapes, Chicago..	2.30	2.30	2.30	1.85
Structural shapes, New York	2.5025	2.5025	2.5025	2.06¼
Cold-finished bars, P'gh.....	2.90	2.90	2.90	2.10
Hot-rolled strips, P'gh.....	2.40	2.40	2.40	1.85
Cold-rolled strips, P'gh.....	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	3.15	3.15	3.15	2.40
Hot-rolled annealed sheets, No. 24, Gary.....	3.25	3.25	3.25	2.50
Sheets, galv., No. 24, P'gh...	3.80	3.80	3.80	3.10
Sheets, galv., No. 24, Gary..	3.90	3.90	3.90	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....	2.40	2.40	2.40	1.85
Hot-rolled sheets, No. 10, Gary.....	2.50	2.50	2.50	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....	3.55	3.55	3.55	2.95
Cold-rolled sheets, No. 20, Gary.....	3.65	3.65	3.65	3.05
Wire nails, Pittsburgh.....	2.75	2.75	2.75	2.10
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.15
Plain wire, Pittsburgh.....	2.90	2.90	2.90	2.40
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.45
Barbed wire, galv., P'gh....	3.40	3.40	3.40	2.60
Barbed wire, galv., Chicago dist. mill.....	3.45	3.45	3.45	2.65
Tin plate, 100 lb. box, P'gh..	\$5.35	\$5.35	\$5.35	\$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

## Pig Iron

Per Gross Ton:	June 22, 1937	June 15, 1937	May 25, 1937	June 23, 1936
No. 2 fdy., Philadelphia.....	\$25.76	\$25.76	\$25.76	\$21.3132
No. 2, Valley furnace.....	24.00	24.00	24.00	19.50
No. 2, Southern Cin'ti.....	23.69	23.69	23.69	20.2007
No. 2, Birmingham†.....	20.38	20.38	20.38	15.50
No. 2, foundry, Chicago*.....	24.00	24.00	24.00	19.50
Basic, del'd eastern Pa.....	25.26	25.26	25.26	20.8132
Basic, Valley furnace.....	23.50	23.50	23.50	19.00
Malleable, Chicago*.....	24.00	24.00	24.00	19.50
Malleable, Valley.....	24.00	24.00	24.00	19.50
L. S. charcoal, Chicago.....	30.04	30.04	30.04	25.2528
Ferromanganese, seab'd car- lots.....	102.50	102.50	102.50	75.00

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

\* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

## Scrap

Per Gross Ton:				
Heavy melting steel, P'gh...	\$18.25	\$18.25	\$18.75	\$13.50
Heavy melting steel, Phila...	17.25	17.25	18.25	12.00
Heavy melting steel, Ch'go...	15.75	15.75	16.75	12.75
Carwheels, Chicago.....	18.25	18.25	19.25	13.50
Carwheels, Philadelphia....	19.75	19.75	19.75	13.75
No. 1 cast, Pittsburgh.....	18.25	18.25	19.25	14.75
No. 1 cast, Philadelphia.....	20.25	20.25	20.25	14.00
No. 1 cast, Ch'go (net ton)...	15.25	15.25	15.25	12.00
No. 1 RR. wrot., Phila.....	19.75	19.75	19.75	14.75
No. 1 RR. wrot., Ch'go (net)	14.50	14.50	15.25	11.50

## Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt.....	\$4.60	\$4.60	\$4.60	\$3.65
Foundry coke, prompt.....	5.25	5.25	5.25	4.25

## Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn...	14.00	14.00	14.00	9.50
Lake copper, New York.....	14.125	14.12½	14.12½	9.62½
Tin (Straits), New York....	55.65	54.62½	56.75	42.62½
Zinc, East St. Louis.....	6.75	6.75	6.75	4.85
Zinc, New York.....	7.10	7.10	7.10	5.22½
Lead, St. Louis.....	5.85	5.85	5.85	4.45
Lead, New York.....	6.00	6.00	6.00	4.60
Antimony (Asiatic), N. Y...	14.75	14.75	14.75	13.00

# The Iron Age Composite Prices

## Finished Steel

June 22, 1937	2.605c. a Lb.
One week ago	2.605c.
One month ago	2.605c.
One year ago	2.097c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	HIGH	LOW
1937.....	2.605c., Mar. 9;	2.330c., Mar. 2
1936.....	2.330c., Dec. 28;	2.084c., Mar. 10
1935.....	2.130c., Oct. 1;	2.124c., Jan. 8
1934.....	2.199c., April 24;	2.003c., Jan. 2
1933.....	2.015c., Oct. 3;	1.867c., April 18
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

## Pig Iron

\$23.25 a Gross Ton
23.25
23.25
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

HIGH	LOW
\$23.25, Mar. 9;	\$20.25, Feb. 16
19.73, Nov. 24;	18.73, Aug. 11
18.84, Nov. 5;	17.83, May 14
17.90, May 1;	16.90, Jan. 27
16.90, Dec. 5;	13.56, Jan. 3
14.81, Jan. 5;	13.56, Dec. 6
15.90, Jan. 6;	14.79, Dec. 15
18.21, Jan. 7;	15.90, Dec. 16
18.71, May 14;	18.21, Dec. 17
18.59, Nov. 27;	17.04, July 24
19.71, Jan. 4;	17.54, Nov. 1

## Steel Scrap

\$17.08 a Gross Ton
17.08
17.92
12.75

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

HIGH	LOW
\$21.92, Mar. 30;	\$17.08, June 15
17.75, Dec. 21;	12.67, June 9
13.42, Dec. 10;	10.33, April 23
13.00, Mar. 13;	9.50, Sept. 25
12.25, Aug. 8;	6.75, Jan. 3
8.50, Jan. 12;	6.43, July 5
11.33, Jan. 6;	8.50, Dec. 29
15.00, Feb. 18;	11.25, Dec. 9
17.58, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25, Jan. 11;	13.08, Nov. 22



pear to be well stocked while others are short of material.

### **Steel Sheet Piling**

New business is light, with the majority of orders for projects of less than 100 tons. This breathing spell is welcomed by some producers who can conveniently use the steel elsewhere. Bids are being taken on a municipal sewer job at Buffalo requiring 224 tons.

### **Plates and Shapes**

Structural inquiries and awards have improved somewhat in the past week and a large portion of them are privately financed projects. The American Bridge Co. is fabricating 1300 tons of material for a manufacturing building and boiler house at Riverview, Mich. Heavy plate and shape specifications are up some from a week ago and, although producers are working down their backlogs, the procedure is a slow one.

### **Sheets**

Sheet buying in the past week included automobile purchases for both 1937 and 1938 models, but the tonnages booked for the latter use are not exceptionally large. A more active market for automobile sheets to be used in the new models is expected next month. The past week's business, however, has been large enough to extend deliveries of the leading producer on light gage cold rolled sheets another week, making them obtainable in 11 to 12 weeks. Hot rolled annealed and galvanized sheets are being promised by the same company in 22 to 23 weeks, while common black sheet promises have been moved up another week to 20 to 21 weeks. Some other producers are able to do better on deliveries and in one or two cases promises range from six to 14 weeks, depending on the grade. Specifications for containers such as drums, pails, etc., are quite brisk and orders for electrical sheets are in good volume. Some jobbing interests are specifying freely.

### **Tubular Products**

Total specifications for tubular products are possibly a little better than a week ago, improvement being largely in oil-country goods specifications. It is possible that this increase in business is due to some apprehension over the current steel labor situation on the part of oil companies, and has resulted in some forward buying. However, the business is for actual requirements, as drilling programs continue to increase. It is also probable that part of the improvement is due to diversion of orders owing to the cutting off of some customers' sources of supplies. Jobbers' stocks of standard pipe which

were built up considerably a few months ago have declined somewhat, with the result that specifications from jobbers to the mills have shown a slight improvement in the past week. The recent activity in tubular goods orders is postponing all attempts of producers to build up their own stocks.

### **Wire Products**

Demand for merchant wire items continues light, with little chance of better activity for the next few months. Specifications for manufacturers' wire, however, continue to flow in freely. Orders covering material for 1938 car models have not made their appearance yet, but producers expect them some time in July. Meanwhile, mills are working down their backlogs which has resulted in easier deliveries on some sizes and grades.

### **Strip**

Demand for hot and cold rolled strip in the past week was about on a par with the previous period. Incoming business in some cases is roughly estimated at 65 per cent of shipments. Some automobile parts makers have submitted plans for 1938 specifications, but as yet little or no tonnages have been booked. Orders continue widely miscellaneous in character and there is still little evidence of orders being diverted to this district on account of the strike situation. Producers expect a much better flow of orders when plans for 1938 automobiles get under way.

### **Tin Plate**

Consumption of tin plate continues unabated, and customers whose source of supply has either been curtailed or cut off completely have made deep inroads into their stocks. While no serious consequences have resulted from steel strikes, apprehension on the part of some customers is growing, especially in view of the expected heavy demand for packers' cans, if present crop outlooks are substantiated. Tin plate production continues at 88 per cent of capacity.

### **Coal and Coke**

Pennsylvania commercial coal producers, through their association last week, served notice on John L. Lewis that they would absolutely disregard his ultimatum to the effect that no coal producers having union contracts could ship coal to steel plants closed on account of strikes. Not only did they indicate that they would not be a party to such a boycott, but they flatly accused Lewis of proposing openly and deliberately to violate his agreement with the coal producers of Western Pennsylvania. The association referred specifically to that part of the contract

between the union and the coal operators which reads, "The operators shall at all times be at liberty to load coal into any transportation equipment whatsoever, regardless of ownership, and to sell and deliver coal loaded into such equipment in any market and to any person, firm or corporation." Meanwhile, accumulations of beehive coke in the Connellsville regions still exist, although some success has been made in working them off. The blowing in of a Lowellville, Ohio, furnace will take up some of the supplies thrown on the market by the blowing out of a Pittsburgh blast furnace a few weeks ago. Some beehive coke plants are working three days a week instead of six and production has been fairly well tuned to shipments.



**Waterbury, Conn.**, has awarded 2500 tons of 16 and 36-in. pipe and fittings to Warren Foundry & Pipe Co.

**Pilot Mountain, N. C.**, closes bids July 2 for pipe for water system; also for 100,000-gal. elevated steel tank on 125-ft. steel tower, and equipment for sewage system. Spoon & Lewis, Greensboro, N. C., are consulting engineers.

**Charlotte, N. C.**, asks bids until July 6 for 29,100 ft. of 24 and 30-in. for main water line; also for about 45,000 lb. of special castings and other waterworks equipment. J. B. Marshall is city manager.

**Willis, Tex.**, will take bids soon for about 11,500 ft. of 6 and 8-in. for water system; also for 50,000-gal. elevated steel tank and tower, pumping machinery and accessory equipment. Cost about \$30,000. Garrett Engineering Co., Houston, Tex., is consulting engineer.

**Big Springs, Tex.**, plans 12-in. for main water supply line; also new steel and concrete water reservoir, filtration plant and other waterworks installation. Cost about \$500,000. J. E. Ward, Harvey-Snyder Building, Wichita Falls, Tex., is consulting engineer.

**Benavides, Tex.**, will take bids soon for pipe lines for water system; also for other waterworks installation and sewer system. Cost about \$130,000. Financing has been arranged through Federal aid. Garrett Engineering Co., Houston, Tex., is consulting engineer.

**Wisner, La.**, has secured fund of \$52,000 through Federal aid for pipe for water system and other waterworks installation.

**Winnsboro, La.**, plans pipe lines for water system and other waterworks installation. Fund of \$81,000 has been arranged through Federal aid for this and sewerage system installation.

**Calhoun City, Miss.**, plans pipe lines for water system extensions. Cost about \$23,000. W. E. Mallett, Jr., Millsaps Building, Jackson, Miss., is consulting engineer.

**Ohio Oil Co.**, Findlay, Ohio, plans pipe line from Rio Grande River to oil field district at Ciudad Mier, Tamaulipas State, Mexico, for water supply in drilling field. Concession has been secured from Government of Mexico.

**Cuba City, Wis.**, plans pipe lines for extensions in water system; also new pumping station. Bond issue of \$25,000 has been authorized.



## CHICAGO

**... Ingot output unchanged at 64 per cent as steel strikes go into fifth week.**

° ° °

**... New business at a fair rate; one producer has best week in past five.**

° ° °

**... Deliveries are not improving to any extent despite heavy production.**

CHICAGO, June 22. — Ingot production in this district remains at 64 per cent of capacity as the steel strikes which have affected three major producers here go into the 27th day. Republic Steel Corp., the only one of the strikebound plants to continue operating, has six open-hearth furnaces on out of eight, while the rate of operation at the plants of the Carnegie-Illinois Steel Corp., and Wisconsin Steel Co. is practically the same as last week.

Business in general is being maintained fairly well, the past week being the best in sales for one producer for the past 30-day period, with one exception, and orders against contracts exceeded those of any week in the last five. Deliveries have not improved noticeably in any product, plates still requiring 12 to 14 weeks for shipment, shapes and bars, three to six weeks, strips, eight to 10 weeks, and sheets, from six and eight weeks to 20 weeks, depending upon the grade and sizes ordered. A good demand also exists for semi-finished material.

Currently, the most consistent consumer of steel has been the farm implement and tractor trade, which is not only specifying heavily against old orders, but is also placing new business constantly. Automobile buying is still light, pending the resumption of full-time operations in that industry on 1938 models. Some buying for springs and bumpers for the late cars has been reported already. However, purchasing by the railroads is at a low level at present, both in plates and rails, although there is some specifying for plates for use in some of the roads' own shops. Mate-

rial for car building programs has mostly been taken, and the movement now under way in that field is expected to be finished soon. Sellers, however, are still optimistic over the prospects of additional large car programs, especially as crop prospects are good and since the size of any programs which may be introduced will depend to a great extent upon this factor.

It is estimated that rail mills have sufficient work on hand to last them through August, with operations until then proceeding at a slightly lower rate than has been the case for the past few months.

Third quarter protection on bars, shapes, plates, sheets and other products has already been asked by some railroads, but the size of these inquiries does not indicate that large construction projects are being contemplated.

Structural inquiries for the week totaled about 13,000 tons, with no particularly impressive projects being reported.

A fair amount of activity has been reported by sellers of bolts and nuts, and prices are said to be firm.

Current sales of foundry coke are good and shipments are running ahead of last week.

Current demand for track accessories and fastenings consists of a few miscellaneous carload lots.

Little is heard of new pipe line projects. The only such job now being talked of is to be laid from Owatonna, Minn., to Minneapolis, to parallel the present line. There is a possibility, however, that this line may be sidetracked and a gas storage tank erected somewhere in

the vicinity of the Twin Cities instead.

Scrap prices remain nominal and unchanged because of the lack of activity brought about by labor conditions.

### Pig Iron

Despite the difficulties which the steel industry is finding placed in its way, foundries and sellers of pig iron are continuing to be busy, with the exception of some foundries which cater mostly to automobile companies, especially Ford and Chrysler. The melt is steady and no signs of an immediate reduction are seen. General Motors is apparently trying to operate with as little shutdown as possible because of model changes, so that foundries supplying castings for these cars are as busy as ever. Shipments are down some from this time last month, but demand has not diminished. Sales for third quarter are greater than sales agents had anticipated, and in addition there is some spot buying for June as well. After the heavy buying in excess of needs during the first quarter, this present movement is not only gratifying to salesmen, but is surprising as well.

### Plates

With car builders taking good tonnages of plates on old contracts to round out their building programs, railroads specifying against orders for material to be used in their own shops, and a fair demand from miscellaneous sources, no reduction has been possible in plate backlogs, and deliveries remain from 12 to 14 weeks. It is probable that some of the miscellaneous tonnage now being received has been diverted from strike-bound plants in this district, and represents material which must be secured immediately. There is said to be almost twice the demand for plates for structural purposes as for shapes.

### Sheets and Strip

Deliveries of these products are still far extended, sheets generally requiring from six to eight weeks for cold rolled, and from 18 to 20 weeks for hot rolled grades, while strip may be secured in from eight to ten weeks. Demand is good, although specifications from the automobile industry are considerably slower. One mill is able to deliver some sizes of enameling sheets as early as the middle of July. Activity with makers of farm equipment is undiminished.

### Bars

Miscellaneous demand for bars is being well maintained, although this week's business is not up to



the weekly average established so far this year. Delivery may be had in three to five weeks. Some buying has been reported from the automobile trade, apparently for 1938 models, since the purchasers are makers of springs and bumpers. Tractor and implement manufacturers are still good bar consumers.

### Structural Shapes

Structural inquiry this week amounts to 13,000 tons, an increase over last week, the largest single project being a bridge at Ottawa, Ill., to take about 2000 tons. Awards are few, an Indiana highway bridge, requiring 810 tons, going to Central States Bridge & Structural Co.; a National Guard armory in St. Louis, taking 435 tons, being awarded to Atlas Iron Works, and a filtration plant in Milwaukee, which is to consume 500 tons of shapes, going to Milwaukee Bridge Co. Inquiries are scarce. One fabricating engineer reports that not a single job of any importance is in sight. American Bridge Co. was awarded 450 tons for the construction of a warehouse for the Concrete Engineering Co. Final disposition of the International Harvester tonnage for the new Indianapolis plant is expected next week. Deliveries of fabricated material are requiring from three to six weeks, and plain material about the same.

### Cast Iron Pipe

Carload and less-than-carload lots constitute the only current business. Large pipe projects are practically non-existent, and sellers do not report any sizable jobs in sight for the next few weeks.

### Reinforcing Bars

If it were not for small lots under 100 tons, most reinforcing bar sellers would have nothing with which to occupy themselves, because larger projects are extremely scarce. The one job of size before the trade here is the Government garage, which has been mentioned before, and will apparently have nearer 1000 tons of bars than 500 tons as was previously stated. Bids on this project will be taken July 1. Prices in Chicago and vicinity are unchanged.

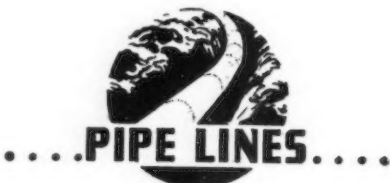
### Wire and Wire Products

Demand for plain wire is surprisingly good for this time of year, considering the heavy buying in earlier months. Fencing materials are not in great demand just yet, as farmers are still in the fields, but a movement in this di-

rection is expected soon. Farm implement makers' requirements are heavy, and miscellaneous demand is also holding up well. Automobile buying is light, however. June sales are expected to top those recorded last month, although nail buying is not as good as sellers expected to see at this time. Prices are firm all through the Middle West and South.

### Rails

No new rail buying has been reported here in some weeks, and nothing of a tangible nature is available which might indicate when further purchasing will be undertaken. It is believed, however, that something definite regarding further rail buying programs may be decided within 30 to 60 days.



Buffalo Pipe Lines, Inc., Avon, N. Y., recently organized, is securing right-of-way for new 8-in. welded steel pipe line from point near Williamsport, Pa., to new bulk terminal station to be built at head of Lake Erie for gasoline transmission to Buffalo area. Booster pumping stations will be installed along route.

Washtenaw Gas Co., Ann Arbor, Mich., and Michigan Gas Transmission Corp., United Artists' Building, Detroit, plan joint construction of 6-in. welded steel pipe line from point near Carleton, Monroe County, to Ann Arbor, about 22 miles, for natural gas transmission to last noted place. Connection will be made with main transmission line of Michigan company at Carleton. Local distribution at Ann Arbor will be carried out by Washtenaw company, which will build control station and extensions to distributing lines.

Consumers Gas & Fuel Co., Miami, Fla., plans extensions in pipe lines for local gas distribution. Company is arranging with municipality for new 30-year gas franchise.

Bureau of Reclamation, Denver, asks bids until June 30 for two steel pipe lines for turbine inlet lines at Boulder power plant, Boulder Canyon Project (Specifications 940-D).

Baton Rouge Electric Co., Baton Rouge, La., plans 10-in. welded steel pipe line from connection with main gas line at Monte Sano to point in city limits on Florida Street, about five miles, for natural gas transmission. Cost about \$75,000 with booster station and control equipment.

Shell Petroleum Corp., Tulsa, Okla., will begin work soon on new 6-in. welded steel pipe line from point near McCamey, Tex., to Goldsmith, Tex., about 50 miles, for crude oil transmission. Cost about \$375,000 with booster stations. Main offices of company are in Shell Building, St. Louis.

Sedgwick, Kan., plans pipe lines for municipal gas distributing system. Bond issue of \$25,000 is being arranged. F. F. Devlin, W-K-H Building, Wichita, Kan., is consulting engineer.

Lordsburg, N. M., is arranging call for bids for steel pipe lines for municipal natural gas distributing system. Cost close to \$50,000.



### ... Structural fabricating plants closed by strike.

ST. LOUIS, June 22.—Six structural steel fabricating plants in the St. Louis industrial district have been closed by a strike called by the International Association of Bridge, Structural and Ornamental Iron Workers of America, which is affiliated with the American Federation of Labor. The sole issue is the demand of the union for closed shops. The plants at which strikes have been called are: Mississippi Valley Structural Steel Co.; Superior Structural Steel Co.; Atlas Iron Works; Banner Iron Works; Stupp Brothers Bridge & Iron Co., and St. Louis Structural Steel Co. The plants had been operating, it is estimated at about 40 to 50 per cent of capacity.

The general contract for an underpass at East St. Louis, Ill., for the Terminal Railway, requiring 500 tons of structural shapes has been awarded to Fruin-Colnon Construction Co., St. Louis.

The amount of 112-lb. rails which the Missouri-Kansas-Texas Railway expects to buy is 1250 tons. The formal inquiry has not yet been issued.

Warehouses have been getting a few more inquiries for finished steel within the last week as a result of the strikes in the mills, but there has been no appreciable increase in bookings. Strikes in the structural fabricating plants here has lessened the already light demand for deliveries of shapes. Inquiries for plates also seems to have fallen off. Paving constitutes about all of the highway projects, and the demand for material from that source is light.

Buying of pig iron is still confined to spot business of a carload or two, melters for the most part having previously made commitments at lower prices than now prevail for requirements into the third quarter. Jobbing foundries here are still very busy catching up on orders for the electrical manufacturing trade, which was tied up for a time by strikes. The stove foundries in the Belleville district and the agricultural implement trade in the Tri-Cities are still going strong.

Ingot operations continue at 90 per cent of capacity.





## ... PHILADELPHIA ...

... *District rate drops one point to 68 per cent.*

• • •

... *Buying interest lags, but backlogs remain heavy.*

• • •

... *Effect of strikes not noticeable here.*

PHILADELPHIA, June 22.—Worth Steel Co. has put on a fourth open hearth, but slight declines in other district plants have forced down the eastern Pennsylvania rate one point to 68 per cent of capacity. Barring any strike trouble in this area, of which there is no evidence so far, the district's operating rate should show no sizable falling off throughout the summer months.

New demand for all types of steel from miscellaneous outlets has fallen to a low point, but releases on old orders from larger users are coming in in heavy volume, and from all indications this steel is going into consumption rather than into reserve stocks. A little business has drifted into local plants from the West, where certain consumers are unable to secure satisfactory delivery from struck mills. However, the total volume is not large.

### **Pig Iron**

New buying of consequence has still failed to materialize. Some small foundries which failed to stock heavily last quarter are in and out of the market for fill-in lots, but the district's aggregate forward needs are well covered by contracts. Sellers look for the situation to remain unaltered for at least a month, after which they look for a return of widespread buying interest arising from the need of stock replenishment in some quarters, and, also, a general desire to obtain protection against possible price advances in the fourth quarter. Furnaces here do not have much iron available over the remainder of the year as they have their regular customers to take care of and in many instances must ship considerable quantities abroad over the next three or four months.

### **Sheets and Strip**

Consumers are showing little or no anxiety with regard to the strike

situation. New buying is at low ebb, and pressure for deliveries on contracts is not quite as insistent as it was a few weeks ago. Although backlogs at the mills have shown no increase over the past week, they are still far more extended than mills would voluntarily have them. Some mills here have participated in a few small orders traceable to switching from struck companies, but, for the most part, local producers do not welcome this type of business as their books are already quite crowded.

### **Plates**

Plate bookings so far this month are only slightly under the May average. Producers are not making much headway against backlogs, and about the best delivery possible on light gages and narrow widths is from four to six weeks, with heavier gages running up to eight weeks. Future demand here looks fairly encouraging. It is reported that Sun Shipbuilding Co. has secured a Standard Oil Co. tanker, which will require 3000 tons of hull steel, and Baldwin Locomotive Works and American Locomotive Co. have each secured 10 Chinese locomotives. Norfolk & Western is inquiring for five locomotives, several other Eastern roads have released sizable third quarter inquiries, and it is possible that one or more Sinclair tankers will be placed with local shipyards.

### **Shapes and Bars**

Fabricating prices are firm despite more active competition for what few jobs are maturing in this area. Reinforcing prices, on the other hand, are somewhat spotty, with distributors in certain instances tending to shade extras under pressure even though mills are charging them full schedules on all new orders. By far the week's most important shape award was the 3500 tons secured by Phoenix Bridge Co. for a bridge at Turners

Falls, Mass. Other awards include 320 tons for a store at Ephrata, Pa., to A. B. Rote & Co., and 100 tons for a Drexel Institute addition to Morris, Wheeler & Co. Mill interest here is currently centered in three large projects; 4500 tons for a local court house, 800 tons for a North Philadelphia school and 9000 tons for a building at Washington. There were no reinforcing awards of any moment during the week, and new tonnages up for figuring are confined to small lots.

### **Imports**

The following iron and steel imports were received here during the past week: 1495 tons of pig iron from British India; 2467 tons of chrome ore from South Africa; 3500 tons of chrome ore from the Philippine Islands; 31 tons of steel bands, 38 tons of steel bars and 28 tons of structural shapes from France; 9 tons of steel bands, 175 tons of steel bars and 146 tons of structural shapes from Belgium.



## ... GREAT BRITAIN ...

... *Mills still declining business owing to raw steel shortage.*

LONDON, June 22 (By Cable).—Two Cleveland furnaces have been relit and two others are due to restart shortly, but practically all of this output will go direct to steel works. Export deliveries are heavily in arrears and home consumers are severely rationed. Continental buyers are offering up to 140s. for prompt East Coast hematite, but sellers are adamant in their refusal. Coke is still rising.

There is little improvement in the position of semi-finished steel supplies and some rerollers are operating on part time. Most heavy steel works are booked for six months and buyers are trying to place 1938 contracts, fearing a rise in prices at the end of the year. Dorman Long booked an order for the largest steel suspension bridge in South Africa over the Zambesi at Chirundu Gorge.

Tin plate mills operating at only 70 to 75 per cent of capacity owing to raw steel shortage. The demand is broadening, but makers are only able to accept a portion of the business offered. Prices are firm.

Black and galvanized sheet makers are being offered much home and export business, but sales are

restricted owing to the scarcity of steel.

United Kingdom exported 13,600 tons of pig iron during May, none of which went to the United States. Total iron and steel was 228,000 tons.

Buyers of Continental steel are reserved and are bargaining over premiums being asked. The mills are heavily engaged and are but little perturbed by the slackening. They are fully confident that there will be a renewal of the demand in early autumn. Controlled products are quoted at official prices plus obligatory premiums. British and Continental prices remain unchanged.



*... Blast furnace operation at 100 per cent for first time since 1928.*

**B**IRMINGHAM, June 21.—Every serviceable blast furnace in the Birmingham district, 18 in number, will be in operation this week. Tennessee Coal, Iron & Railroad Co., on Tuesday, will blow in the last idle stack, Ensley No. 6. This is the first time since December, 1928, that the Tennessee company has had all of its blast furnaces in production. All of the pig iron companies are now on a 100 per cent basis, with the Tennessee company operating six at Ensley and two at Fairfield; Woodward Iron Co., three at Woodward; Sloss-Sheffield Steel & Iron Co., two in the city and two at North Birmingham; Republic Steel Corp., two at Thomas and one at Gadsden.

Last week 18 open hearths were operated, eight at Fairfield, four at Ensley and six at Gadsden. Toward the latter part of this week there will be 19, as the Tennessee company is planning to add another unit at Ensley.

Pig iron buying for the third quarter has been proceeding at a moderate rate. This new business, together with backlogs, places the furnaces in a favorable position for the next quarter.

Steel buying has slackened somewhat and it now looks as if the market is entering the normal seasonal dip and that buying will be quiet for the next month or so. However, backlogs are still exces-

sively large and will provide steady operations and shipments for a long time to come. Most of the mills are still being worked to their capacity and no early let-up is in sight, regardless of current market conditions.

Tennessee Coal, Iron & Railroad Co. announced last week that shipments of finished steel products for the first five months of 1937 were at the rate of more than 10,000 tons per month above the average monthly shipments for the same period of 1929; also that the shipments for this five-month period of 1937 were 29 per cent ahead of the same period of 1936. Comparative figures as to employment indicate an increase of over 16 per cent above the 1929 figures.

Universal Atlas Cement Co. is proceeding with plans for the construction of a new machine shop at its Leeds, Ala., plant. This is another unit in its \$2,000,000 rebuilding program.



*... Awards of 6300 tons —4200 tons in new projects.*

#### AWARDS

Huntington, Mass., 170 tons, bridge over Westfield River, to Truscon Steel Co.

Boston, 300 tons, court house, to Bethlehem Steel Corp.

Barkamsted, Conn., 150 tons, Bills Brook dam, to Bancroft & Martin Rolling Mill Co.

Tonawanda, N. Y., 400 tons, new Chevrolet plant, River Road, to Bethlehem Steel Corp.

New York, 1320 tons, Bronx-Whitestone bridge, to Bethlehem Steel Corp.

Astoria, N. Y., 160 tons, William Cullen Bryant High School, to Carroll-McCreary Co.

Hoboken, N. J., 300 tons, Publications Corp. building, to Igoo Brothers, Inc.

Carbon County, Pa., 400 tons, grade crossing elimination, to Bethlehem Steel Corp.

Wilmington, Del., 400 tons, grade crossing elimination, to Taylor Davis, Inc.

Elkhart, Ind., 260 tons, Alka-Seltzer Co. building, to Concrete Engineering Co.

Fort Wayne, Ind., 120 tons, International Harvester Co. building, to Joslyn Steel Corp.

Detroit, 300 tons, General Motors Corp. building, to Truscon Steel Co.

Moline, Ill., 100 tons, International Harvester Co. building, to Inland Steel Corp.

Manhattan, Kan., 400 tons, Kansas City college building, to Sheffield Steel Corp.

Mesa, Ariz., 158 tons, Salt River project, to Carnegie-Illinois Steel Corp.

Casper, Wyo., 125 tons, Casper-Alcova project, to Colorado Fuel & Iron Co.

Boise, Idaho, 139 tons, Boise-Payette project, to Inland Steel Co.

Fort Baker, Cal., 250 tons, wharf, to Soule Steel Co.

Emeryville, Cal., 160 tons, paraffin plant, to Colorado Fuel & Iron Co.

Calexico, Cal., 395 tons, All-American Canal project, to Truscon Steel Co.

Potholes, Cal., 135 tons, Gila project, to Carnegie-Illinois Steel Corp.

Potholes, Cal., 135 tons, Gila project, to Bethlehem Steel Corp.

#### NEW REINFORCING BAR PROJECTS

Wallingford, Vt., 100 tons, State road.

Northampton, Mass., 800 tons, Connecticut River bridge.

Teterboro (Bendix), N. J., 200 tons, Bendix Aviation Corp.; Goffels & Vallet, Detroit, architects.

Erie, Pa., 375 tons, East Avenue overpass; bids July 2.

State College, Pa., 500 tons, dormitory.

Baltimore, 275 tons, sewage plant.

Lansing, Mich., 210 tons, six highway bridges.

Chicago, 1500 tons, post office garage.

Salt Lake City, 119 tons, State bridge; bids June 28.

San Francisco, 100 tons, U. S. Engineers; bids taken June 22.



*... New England industries continue very busy.*

**B**OSTON, June 22.—Orders for third quarter pig iron continue to filter into furnace offices, but foundries generally apparently are in no hurry to cover requirements while the national labor situation is so unsettled. Past week's sales aggregated 1500 tons. Certain steel mills, heretofore pig iron sellers, are not a market factor just now.

Shoes and woolen textiles, two of New England's largest industries, are very well occupied. Cotton textile makers have a good backlog of orders, but are obtaining very little new business. Electrical appliances, machine tool textile machinery, and special machinery manufacturers are quite busy, but not as much so as a month or two ago. Some foundries have dropped running schedules from six to five days a week.





## ... CLEVELAND ...

*... Steel ingot output slightly higher in Cleveland-Lorain district.*

o o o

*... Demand declining due to seasonal conditions and the influence of labor unrest.*

o o o

*... Some shipments held up and others postponed until later dates.*

CLEVELAND, June 22.—Steel ingot output advanced two points this week to 58 per cent in the Cleveland-Lorain district. In the Youngstown district, where operations are interrupted by strikes, the output is unchanged at 44 per cent of capacity.

Incoming business in finished steel has fallen off slightly as compared with the early part of the month. In addition to the seasonal decline, demand is being affected by strikes in consuming plants and by uncertainty regarding future trend of business caused by the labor unrest. Most consuming plants not troubled by strikes are continuing good operation, but many of these have good stocks of steel and are placing little new tonnage.

With the decline in new demand, there is no evidence of a shortage of steel due to the forced curtailment of output by strikes, and buyers having their usual sources of supply cut off are having no trouble in placing steel elsewhere for their required deliveries.

Not much new business is coming from the automotive industry. Cleaning up of production of old models and a start on new models are being delayed by numerous strikes. The Fisher Body plant in Cleveland, which shut down a week ago because, with labor troubles in other General Motors plants, it was producing bodies faster than needed, will resume operations Thursday, permitting the release of suspended steel shipments.

Manufacturers of power shovels, farm tractors and road scrapers continue very busy and have well filled order books.

The delivery situation continues to improve, this being particularly true of all grades of sheets except galvanized. The recent pressure of sheet deliveries has been followed by both the holding up of shipments and the extension of delivery dates on some tonnage that was placed when consumers were buying far in advance in order to assure deliveries when needed.

### **Pig Iron**

Sales continue quiet, though shipments are being sustained as the deadline for second quarter delivery approaches. Shipments are as good as they were in May. Foundry operations have declined somewhat in the last three weeks, due partly to seasonal influences and uncertainty over the labor outlook. Diversion of orders placed with furnaces now closed by strikes to unaffected makers is now more evident, some customers apparently being unable to wait longer for their iron. This is believed to be true mainly of smaller foundries, as larger interests have relatively heavier inventories to draw upon. An order for gray iron castings filled by a local foundry which does not employ union help was returned by the buyer, because employees in his shop, having signed with the CIO, refused to machine products made with non-union labor. Other instances of this kind are believed to have occurred.

### **Sheets**

Not much new business is being placed and deliveries on most grades have further improved. Stamping plants making automobile parts are still fairly busy and makers of refrigerators and stoves

are maintaining high production, but these consumers have good stocks and are buying little steel. Mills have caught up on some orders to the extent that consumers are holding up shipments of material already rolled and other consumers have asked mills to set back the delivery of sheets that they ordered for anticipated requirements. Deliveries in five and six weeks are being promised on cold rolled and hot rolled pickled sheets, but show no improvement on galvanized sheets.

### **Strip Steel**

New demand is very light. Automobile parts plants are taking steel due on old contracts which are nearly cleaned up and little tonnage has been placed for new models. Miscellaneous demand continues fair. Deliveries are gaining. Mills can take orders for wide hot rolled strip for July shipment, but are about filled up with narrow material for that month. Deliveries of cold rolled strip range from six to eight weeks.

### **Bars, Plates and Shapes**

While demand for bars is not very active, business is holding close to the volume of the past few weeks. There is some demand from forge shops for work other than automobile forgings and miscellaneous orders are fair. Structural shapes are quiet. Activity in the construction field is slack, both public and private inquiries being light. Bids were taken today for the Industrial Rayon Corp. plant in Painesville requiring 4000 tons of structural shapes and reinforcing bars. Plate orders have declined. Better deliveries are being promised on both plates and shapes.

### **Iron Ore**

With pressure for deliveries relieved by the shutting down of steel plants by strikes, ore shipments have tapered off slightly. Cargo boats are not being tied up, but many that had been going to the upper Lake ports light to speed up the movement of ore are now carrying coal to these ports and bringing back ore, thus lengthening the time of their round trip. The shutting down of mines has been limited to a few open pit properties. Several underground mines are putting their ore in stock piles as is customary outside of the season of navigation, so that their operations are not being interrupted. Mine operators report that CIO organizers are making no headway in the iron mining districts. Workers in the mines were granted a voluntary advance to a minimum wage of \$5 a day early in the spring and are said to be



about satisfied with their present earnings.

Consumption of Lake Superior iron ore during May was little affected by the steel strikes, as these did not start until near the end of the month, and increased 206,834 tons over April, to 5,321,011 tons. The April volume had been 5,114,177 tons, while in May, 1936, ore consumed was 3,882,173 tons. Stocks at furnaces and Lake Erie docks on June 1 were 442,925 tons less than on June 1 a year ago, or 18,799,568 tons. Furnace stocks on that date were 16,255,378 tons. Banking of some furnaces by strike-affected producers toward the month's close decreased the number in blast to 138 on May 31, a decline of 17 from the month before.

#### **Wire Products**

Backlogs are being steadily reduced, though deliveries in two months are still the best that can be obtained on certain items. Without a price incentive to urge buyers on, customers are placing orders more leisurely for third quarter shipment, and business is likely to spread out rather evenly over that period. While wire mills are maintaining operations at previous levels, the fact that they admit now being able to include occasional hurry-up orders in their schedules from needy consumers indicates conditions are less pressing than heretofore.

#### **Bolts and Nuts**

New business has fallen off, although the volume is still fair. Specifications from the motor car manufacturers have declined considerably. Demand from agricultural implement manufacturers continues good. Railroads have inquiries out for third quarter requirements.



### **....BUFFALO....**

#### **... Steel plant operations decline slightly.**

**B**UFFALO, June 22.—Steel mill operations show the Lackawanna plant of Bethlehem operating 26 open hearths; Republic, seven and Wickwire-Spencer, two. Bethlehem's Lackawanna plant is operating three less open hearths and Wickwire-Spencer, one less than last week. Two of Bethlehem's idle furnaces are down for repairs and one possibly will be operating be-

fore the end of the week. The idle Wickwire furnace will be operating definitely before the end of the week, giving this plant three active open hearths.

The steel strike has brought increased business to Buffalo warehouse interests. This particularly is true of plates, which are moving steadily and in volume. Structural and bar business is not so good, but sheet business is more than fair. The movement is ahead of last year, though not quite up to the volume averaged during the first four months of the year.

The contract to furnish 400 tons of reinforcing bars for the new Chevrolet plant in the town of Tonawanda has been placed with the same fabricator that contracted for the structural steel. A boiler house contract for the present Buffalo Chevrolet assembly plant has been awarded to a Buffalo fabricator.

A heavy volume of pig iron has been booked since the first of the month.



### **...CINCINNATI...**

#### **... Sheet demand declines backlogs still heavy.**

**C**INCINNATI, June 22.—Labor difficulties in other areas and seasonal influences are believed to be the immediate causes of a further decline in sheet steel demand during the past week. Sales were equal to about 70 per cent of capacity, the lightest in recent months. Some emergency ordering from new sources to cover consumer needs until strike difficulties release the normal flow is benefiting local producers, but tonnage totals are unimpressive. Automobile requirements are off, although ordering for new models is beginning to trickle in. Mill interests report a retrenchment attitude on the part of consumers, who fear the effect of extensive labor difficulties in the industry. District mills, however, are still carrying heavy backlogs, and rolling schedules for the next 30 days reveal no likelihood of recession from the present full capacity production.

The local pig iron market is sluggish. New business is almost negligible and confined to spot orders for filling in. Shipments against contracts show no easing from the previous brisk rate. Furnace interests report melters to be

conservative toward future buying because of the extensive labor activity and because of the slackening in castings demand. While the melt is still in good proportion, it is lighter than recent peaks as foundry interests try to spread work to keep forces intact against an anticipated rise in demand. Foundries supplying heating equipment manufacturers, however, are an exception to the general trend. In this field, the melt is heavier to meet the brisk summer activity.

While coke prices are unchanged, new business in fuel is small.



### **..SAN FRANCISCO..**

#### **... Reinforcing bar market active; other lines quiet.**

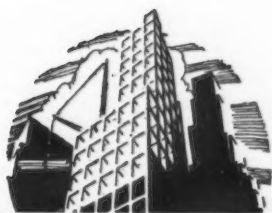
**S**AN FRANCISCO, June 21.—Only in the reinforcing bar market was any activity shown on the Pacific Coast last week. Largest single award of the aggregate 1946 tons was the letting of 395 tons for the All-American Canal reclamation project at Calexico, Cal., to Truscon Steel Co. Soule Steel Co. took 250 tons of bars for a reinforced concrete wharf at Fort Baker, Cal. No structural steel awards of importance were made.

MacDonald & Kahn Co. was low bidder for general construction of the San Francisco railway terminal for the S. F.-Oakland Bay Bridge. This project calls for 3200 tons of reinforcing bars and 2840 tons of structural steel. Only bid submitted on the entire job was that of Geo. A. Fuller Co., Los Angeles, and amounted to \$2,283,377. Columbia Steel Co. was low bidder on some 2000 tons of structural on one contract of this project.

Plans are being studied at Marshfield, Ore., for construction of a \$2,000,000 water supply development in Brewster Valley. Work involves construction of a 110-ft. dam, a 36-mile pipeline and appurtenances.

Low bidders on 835 tons of cast iron pipe for the city of San Francisco are U. S. Pipe & Foundry Co. on 450 tons and Central Foundry Co. on 375 tons.

Seasonal inactivity continues, though mills remain active. Backlogs of from 30 to 60 days are still in effect.



## ...NEW YORK...

*... Volume of business dwindling, but revival is expected when strikes are settled.*

° ° °

*... Tin plate shipments heavy; plates and shapes outstanding in new tonnage.*

° ° °

*... Reinforcing bar inquiries of good size bring fresh price concessions.*

**N**EW YORK, June 22.—In the face of dwindling business, the local steel trade has lost none of its hopefulness that once steel strikes are settled and the seasonal adjustments incident to the summer season are over a fresh wave of buying will take place that will sustain high operating rates at the mills through the remainder of the year. The amazing thing is the vitality of business despite the loss of confidence due to labor disorders and the supineness of Government authority in submitting to dictates of the CIO. While new tonnage is in small volume as compared with the high records of March and some other months earlier in the year, shipments are going forward with only such interruption as is caused by strike disturbances. The fact that consumption remains at a high rate is borne out by the fact that little or no cancellations, suspensions or hold-ups have occurred. On the contrary, some companies are experiencing a better demand for certain products than they had a few weeks ago.

Tin plate is the most active of all products. There is not much new business because mills are already booked full until October or later, but shipments are leaving the mills as rapidly as they can be gotten out, and users would take more if they could get it. A question arises as to the handling of unshipped tonnage after Oct. 1, when the \$5.35 price becomes effective on all contracts. Strike-affected companies will, of course, not be able to complete all of the tonnage they engaged to deliver by that date; hence some shipments at the \$4.85 contract price are likely to string out into the fourth quarter.

The most active items in new

tonnage are plates and shapes. Bookings of these products have represented a fairly good proportion of the past week's total business. Reinforcing bars are also active, about 12,000 to 15,000 tons being up for early disposition in this district. Incidentally this is the only product in which there is price weakness. Distributors have recently made concessions amounting to several dollars a ton on sizable jobs.

To what extent the decline in business is due to seasonal conditions and how much of it may be ascribed to fears over labor unrest is impossible of determination, but it is likely that both factors are having an influence. However, there is little serious concern over the business decline in view of the large backlogs still existent.

### Pig Iron

With the second quarter tonnage that will be carried over, together with specific bookings for the third quarter, most blast furnaces that sell in this district find themselves fairly well booked for the third quarter. There is some tonnage available, but not a great deal. No new buying movement of any importance is expected before late July or August, at which time the possibility of higher pig iron prices for the fourth quarter may stimulate speculative buying, if at that time prospects for fourth quarter castings business appear to be promising. There are no indications that pig iron production over the next few months will exceed the demand: First, because some furnaces that are now in blast have been running on one lining for a long time and may have to be blown out for relining soon, as has already happened in a few cases; second, no additional furnaces ca-

tering to the merchant trade are likely to go into blast because of present high costs of ore and coke. Export buying has continued in fair volume, involving mostly 1000 to 2000-ton lots, with China the most active of foreign buyers. Lack of anticipated Far East buying is generally credited to insufficient ship space.

### Wire

Wire business has dropped considerably in the past month, but in the local area a slight pickup is noted in the past week, indicating that the low spot has been passed. Bed spring manufacturers led in this renewed buying movement. As a result, fairly well sustained operations are looked for in July and August. Deliveries are still prompt and run from a week to 10 days on common wire.

### Sheets and Plates

New business in sheets has fallen off, but shipments are being maintained at capacity by most mills. As a result of the reduction in mill backlogs, delivery promises are being improved. Black sheets are now obtainable in six to eight weeks, and cold finished sheets in six to 14 weeks. Strip is obtainable in three to four weeks. Customers are still pressing for delivery on old orders, more for fear of holdups resulting from labor disturbances than because of any increase in their own plant activity. Some new freight car orders are expected to provide an outlet for plates in the near future. The Tientsin-Pukow Railroad, China, has placed orders for 10 locomotives with the Baldwin Locomotive Works and 10 with the American Locomotive Co. Decision on the two Sinclair oil tankers has been postponed.

## Donora Mill to Close For Week's Vacation

**A**MERICAN STEEL & WIRE CO. will give approximately 1100 of the employees of its Donora, Pa., plant a week's vacation during the week of June 28. During that period the open hearth, blooming mill and three rod mills at the plant will be closed for repairs. The blast furnace, wire mill and zinc works will continue to operate.

The American Steel & Wire Co.'s vacation plan provides for a week's vacation with pay for any employee having five years' service. Approximately two-thirds of the company's employees have that long service records and are eligible for vacation.



# FABRICATED STEEL

*... Lettings slightly lower at 15,325 tons compared with 15,600 tons last week.*

□ ○ □

*... New projects in better volume at 23,000 tons as against 14,750 tons a week ago.*

## NORTH ATLANTIC STATES

**East Springfield, Mass.,** 300 tons, Westinghouse Electric & Mfg. Co. foundry, to Haarmann Steel Co., Holyoke, Mass.

**Bloomfield, Vt.,** 100 tons, State bridge, to Vermont Structural Co., Burlington, Vt.

**Turners Falls, Mass.,** 3500 tons, bridge, to Phoenix Bridge Co., Phoenixville, Pa.

**Mount Vernon, N. Y.,** 135 tons, railroad bridge, to American Bridge Co.

**New York,** 1050 tons, Whitestone-Bronx bridge, WB-2, foundation, caissons and cutting edges, to Dravo Contracting Co.

**New York,** 340 tons, boiler framing, Consolidated Edison Co., to Eggleston Brothers & Co., Long Island City.

**West Point, N. Y.,** 220 tons, quarter-master garage, to Belmont Iron Works, Philadelphia.

**Rochester, N. Y.,** 2100 tons, Delco Appliance plant, General Motors Corp., to Bethlehem Steel Corp.

**Buffalo,** 400 tons, Erie County jail, to Bethlehem Steel Corp.

**Buffalo,** 100 tons, boiler house for present Chevrolet plant, to R. S. McMannus Steel Construction Co., Buffalo.

**Trenton, N. J.,** 110 tons, machine shop, to Belmont Iron Works.

**Philadelphia,** 110 tons, Drexel Institute addition, to Morris Wheller & Co., Philadelphia.

**Ephrata, Pa.,** 330 tons, Royer store, to A. B. Rote Co., Lancaster, Pa.

**Pittsburgh,** 160 tons, Duquesne Light Co., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

**Russell, Pa.,** 270 tons, State highway bridge, to Lackawanna Steel Construction Corp., Buffalo.

**Cumberland, Md.,** 550 tons, power station and bunker, Potomac Edison Co., to Ingalls Iron Works Co., Birmingham.

## THE SOUTH

**West Palm Beach, Fla.,** 346 tons, Nassau River bridge for Seaboard Airline, to Ingalls Iron Works Co.

**Atlanta, Ga.,** 185 tons, Cluett-Peabody building, to Ingalls Iron Works Co.

**Bartow, Fla.,** 445 tons, Swift & Co. phosphate plant, to Ingalls Iron Works Co.

**St. Petersburg, Fla.,** 130 tons, Dusenbury Hotel, to Aetna Iron & Steel Co.

**State of Louisiana,** 295 tons, two bridges, to Mosher Steel Co., Dallas, Tex.

**Dallas, Tex.,** 230 tons, steam station, to Mosher Steel Co.

**Kimble County, Tex.,** 380 tons, bridge, to Mosher Steel Co.

**Potter County, Tex.,** 205 tons, bridge, to Virginia Bridge Co., Roanoke, Va.

## CENTRAL STATES

**Ann Arbor, Mich.,** 200 tons, King-Seeley Corp. factory addition, to Whitehead & Kales Co., Detroit.

**Detroit,** 200 tons, Budd Mfg. Co., to Acorn Iron Works, Detroit.

**Detroit,** 145 tons, warehouse and office building, to Roura Iron Works, Detroit.

**Highland Park, Mich.,** 140 tons, Michigan Bell Telephone Co. building extension, to R. C. Mahon Co., Detroit.

**Cincinnati,** 150 tons, Lerner Shops of Ohio Store building, to L. Schreiber & Sons Co., Cincinnati.

**Toledo, Ohio,** 500 tons, vocational high school, to Whitehead & Kales Co., Detroit.

**Dayton, Ohio,** 230 tons, store and office building, Talbot Realty Co., to Bethlehem Steel Corp.

**Batesville, Ind.,** 810 tons, highway bridge, to Central States Bridge & Structural Co., Indianapolis.

**Chicago,** 450 tons, warehouse, to American Bridge Co.

**Milwaukee,** 500 tons, filtration plant, to Milwaukee Bridge Co.

## NEW STRUCTURAL STEEL PROJECTS

### NORTH ATLANTIC STATES

**Colrain, Mass.,** 200 tons, two State bridges.

**Athol, Mass.,** 100 tons, State bridge.

**Fitchburg, Mass.,** 100 tons, State bridge.

**South Boston, Mass.,** 1100 tons, Edison Electric Illuminating Co., power house.

**Northampton, Mass.,** 1200 tons, Connecticut River bridge.

**Shelburne Falls, Mass.,** 215 tons, bridge; bids June 29.

**Teterboro (Bendix), N. J.,** 2200 tons, Bendix Aviation Corp. plant; Giffels & Vallet, Detroit, architects.

**Trenton, N. J.,** 5000 tons, plant for Ternstedt Division, General Motors Corp.

**Woodbridge, N. J.,** 230 tons, bridge; bids June 28.

**Tonawanda, N. Y.,** 350 tons, New York Central bridge; C. B. Moon Co., Cleveland, contractor.

**Erie, Pa.,** 250 tons, East Avenue overpass; bids July 2.

**Kenilworth, Pa.,** 350 tons, bridge; bids July 1.

## THE SOUTH

**Richmond, Va.,** 1000 tons, manufacturing building, Philip Morris & Co.

**Grottoes, Va.,** 825 tons, manufacturing plant, Duplan Silk Corp.; bids in.

**Clarksburg, W. Va.,** 350 tons, underpass.

**Lexington, Ky.,** 450 tons, biological science building for University of Kentucky.

**State of Alabama,** 1300 tons, operating bridge deck for Chickamauga and Gunterville dams.

**Alabama City, Ala.,** 1800 tons, open-hearth building for Republic Steel Corp.

**Great Falls, S. C.,** 225 tons, bridge; bids in.

## CENTRAL STATES

**Presque Island Harbor, Mich.,** 250 tons, breakwater extension.

**Lansing, Mich.,** 555 tons, six State highway bridges.

**Painesville, Ohio,** 1900 tons, Rayon Machinery Corp.

**Warren, Ohio,** 100 tons, addition for Sears-Roebuck & Co.

**Chicago,** 300 tons, paper storage building, Cuneo Press, Inc.

**Ottawa, Ill.,** 2000 tons, bridge.

**East St. Louis, Ill.,** 500 tons, underpass for Terminal Railway; Fruin-Colnon Construction Co., St. Louis, general contractor.

## WESTERN STATES

**Garfield, Utah,** 400 tons, flue, American Smelting & Refining Co.

## FABRICATED PLATES

### AWARDS

**Wilkes-Barre, Pa.,** 105 tons, kiln for Vulcan Iron Works, to Bethlehem Steel Corp.

### NEW PROJECTS

**Hengersville, Ala.,** 654 tons, dam gates.

**Detroit,** 400 tons, coal bunker, Great Lakes Steel Corp.

## SHEET PILING

### AWARDS

**New York,** 2950 tons, East River Drive, to Bethlehem Steel Corp.

**Philadelphia,** 170 tons, Navy Department for Cavite, Philippine Islands, for railway repairs, to Jones & Laughlin Steel Corp.

**Cleveland,** 700 tons, Cleveland Electric Illuminating Co., to Carnegie-Illinois Steel Corp.

### NEW PROJECTS

**Northampton, Mass.,** 1000 tons, Connecticut River bridge.

**Queens, N. Y.,** 3000 tons, Jacob Riis Park.

**Avon-by-the-Sea, N. J.,** 110 tons, reconstruction and extension of jetties.

**Buffalo,** 224 tons, municipal sewer project.





# ...NON-FERROUS...

... **Copper bookings continue in fair volume; price unchanged.**

... **Lead stocks reduced 12,600 tons in May; spot zinc scarce.**

... **Strike continues to discourage tin sales.**

**B**OOKINGS of electrolytic copper for the week continued in fair volume, averaging about 1000 tons per day, with 80 per cent of the buying for September shipment, and the balance for nearby positions. The price level continues to hold firm at 14c. per lb., Connecticut

Valley. Contrary to expectations, domestic refiners are not concerned over the announced opening of new ore bodies in Africa. Inasmuch as consumption has been consistently exceeding production, the availability of new sources will have no effect on the market other than

possibly resulting in slight easiness in sentiment for late fall positions. Although there is scattered demand for spot positions, most producers are unwilling to entertain much additional business of this type. The London exchange continued its erratic movements throughout the week. Today's price ranged between 13.40c. and 13.45c. per lb., c.i.f., usual Continental base ports.

## Lead

As estimated last week, the final figures for May deliveries were in excess of 50,000 tons, the actual total being 55,212 tons, which almost exactly equaled April shipments. Production in May aggregated 42,612 tons, indicating that stocks were reduced by 12,600 tons. Buying over the past week continued at a satisfactory pace, with the price holding firmly at 6c. per lb., New York. June positions are almost completely sold, and July is about 55 per cent covered. London markets were steadier today, with metal being offered freely at 4.85c.

## Zinc

This week's spelter market was featured by an intensified scarcity of spot supplies. The fact that an identical condition exists abroad has discouraged buyers from seeking foreign coverage, even though the present price basis might make this course attractive. Prime Western sales for the week, amounting to 3246 tons, were slightly higher than the total for last week, and undelivered metal now stands at 56,160 tons. All metal being offered is quoted firmly at 7.10c., New York. British metal, on first call this morning, was quoted at 4.56c., but buying activity continues at low ebb.

## Tin

The only interesting feature in an otherwise very dull market was the persistent buying of July positions by one dealer in face of a 30-point premium over August tin. Straits metal was quoted today at 55.65c., New York, an advance of 1.025c. over last week's position. Futures, on first call this morning in London, were quoted at £245 15d.

## Ingot Brass and Bronze

The average prices received by members of the Non-Ferrous Ingot Metal Institute, during the 28 days ending June 11, on commercial 80-10-10 and 80-5-5-5 brass ingots, were 15.814c. and 13.785c. per lb. respectively. Deliveries of brass and bronze ingots and billets for May amounted to 8210 tons, as compared with 10,101 tons in April. Unfilled orders amounted to 18,037 tons on June 1, as against 20,549 tons on May 1.

### The Week's Prices. Cents Per Pound for Early Delivery

	June 16	June 17	June 18	June 19	June 21	June 22
Electrolytic copper, Conn.*	14.00	14.00	14.00	14.00	14.00	14.00
Lake copper, N. Y.....	14.125	14.125	14.125	14.125	14.125	14.125
Straits tin, spot, New York	55.125	55.25	55.25	...	55.375	55.65
Zinc, East St. Louis.....	6.75	6.75	6.75	6.75	6.75	6.75
Zinc, New York.....	7.10	7.10	7.10	7.10	7.10	7.10
Lead, St. Louis.....	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York.....	6.00	6.00	6.00	6.00	6.00	6.00

\*Delivered Connecticut Valley; price ¼c. lower delivered in New York.  
Aluminum, virgin 99 per cent plus 20.00c.-21.00c. a lb., delivered.  
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.  
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.  
Antimony, Asiatic, 14.75c. a lb., prompt, f.o.b., New York.  
Quicksilver, \$96.00 to \$98.00 per flask of 76 lb.  
Brass ingots, commercial 85-5-5-5, 14.00c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

### From New York Warehouse

Delivered Prices, Base per Lb.	
Tin, Straits pig.....	56.25c. to 57.25c.
Tin, bar.....	59.50c. to 60.50c.
Copper, Lake.....	15.00c. to 16.00c.
Copper, electrolytic.....	15.00c. to 16.00c.
Copper, castings.....	14.75c. to 15.75c.
*Copper sheets, hot-rolled.....	21.62 ½c. to 19.50c.
*High brass sheets.....	19.50c.
*Seamless brass tubes.....	22.25c.
*Seamless copper tubes.....	22.37 ½c.
*Brass rods.....	16.00c.
Zinc, slabs.....	8.00c. to 9.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over.....	13.75c.
Lead, American pig.....	7.00c. to 8.00c.
Lead, bar.....	8.00c. to 9.00c.
Lead, sheets, cut.....	10.50c.
Antimony, Asiatic.....	15.50c.
Alum., virgin, 99 per cent plus.....	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent.....	19.50c. to 21.00c.
Solder, ½ and ½.....	35.00c. to 36.00c.
Babbitt metal, commercial grade.....	25.00c. to 65.00c.

\*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33 ½ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

### From Cleveland Warehouse

Delivered Prices per Lb.	
Tin, Straits pig.....	59.375c.

Tin, bar.....	61.375c.
Copper, Lake.....	15.00c. to 15.25c.
Copper, electrolytic.....	15.00c. to 15.25c.
Copper, castings.....	14.75c. to 15.00c.
Zinc, slabs.....	8.75c. to 9.00c.
Lead, American pig.....	6.50c. to 6.75c.
Lead, bar.....	10.00c.
Antimony, Asiatic.....	16.50c.
Babbitt metal, medium grade.....	23.50c.
Babbitt metal, high grade.....	64.00c.
Solder, ½ and ½.....	37.50c.

### Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	10.75c.	11.50c.
Copper, hvy. and wire.....	10.125c.	10.625c.
Copper, light and bottoms.....	9.125c.	9.375c.
Brass, heavy.....	6.125c.	6.75c.
Brass, light.....	5.00c.	5.75c.
Hvy. machine composition.....	9.00c.	9.50c.
No. 1 yel. brass turnings.....	7.375c.	7.875c.
No. 1 red brass or compos. turnings.....	8.75c.	9.25c.
Lead, heavy.....	4.625c.	5.00c.
Cast aluminum.....	12.125c.	13.25c.
Sheet aluminum.....	13.25c.	14.75c.
Zinc.....	3.50c.	3.875c.



## IRON AND STEEL SCRAP

*... No. 1 steel is holding its own in all markets, although a small tonnage sold off at Pittsburgh.*

□ ○ □

*... Composite remains at \$17.08 in nominal market.*

**JUNE 22.**—For the first time in 11 weeks, THE IRON AGE composite scrap price remains the same as the preceding week, at \$17.08, after having skidded down \$4.84 from the April 6 high of \$21.92. No. 1 heavy melting steel is still quotable at \$18 to \$18.50 at Pittsburgh, although a small tonnage was sold at \$18 delivered. Steel is being picked up at an average price of \$18.25 there, so that the \$18 figure hardly sets the market. Other items, including low phos. grades and bundled sheets, are marked off 50c. at Pittsburgh, whereas in all other markets prices are nominal and unchanged from the preceding week, all as a result of adverse strike news. An exception is Boston, where bundled skeleton is off 50c. In New York, heavy breakable cast has been raised 25c. on the strength of dealer offerings in order to cover a Harrisburg, Pa., order.

### **Pittsburgh**

Further sales of No. 1 steel at \$18.50 were made into consumption this past week. A moderate sized tonnage has also been sold within the last two days at \$18 a ton. However, in view of the fact that scrap is not coming out very plentifully at present quotations and that dealers are paying \$18.25 to cover more often than they are paying \$18 a ton, No. 1 heavy melting steel remains quotable at \$18 to \$18.50. So far, the only item diverted to this district on account of labor disturbances elsewhere involves machine shop turnings, which are off 50c. a ton. The entire list of scrap prices is more or less nominal owing to the dearth of buying and the extreme caution being exercised by dealers, who are finding the present market a difficult one to gage. There is little doubt that as long as labor disturbances continue, the trend of scrap prices in this district will be downward.

### **Chicago**

The resumption of scrap shipments last week by one mill unaffected by

strikes did not provide the stimulus to this market that was expected, and brokers and dealers are back in the doldrums again. Prices are unchanged, there having been no activity of any importance during the last seven days.

### **Philadelphia**

All mills here have moderate backlogs and are taking deliveries at a pace approximating current consumption. Even though these old orders are rapidly being cleaned up, mills feel that new commitments are not warranted at the present moment; for developments on the strike front could change the present price picture overnight. No. 1 steel now is priced between \$17 and \$17.50, with Bethlehem buying small lots direct at levels a shade under \$17. No. 2 is decidedly more plentiful and is freely available at from \$15 to \$15.50. Foundry business has tended to slide off within recent weeks, and for this reason cast grades are increasingly hard to move. Prices, however, have yet shown no serious weakness. Export is still no factor here. Some lots are now being released for boat delivery, and another boat is expected in within a fortnight.

### **Cleveland**

One or two mills here are taking a little blast furnace scrap, but with the district's open-hearth operations greatly reduced by strikes, steel-making grades are inactive. Prices remain nominally unchanged. No shipments are being made to mills at Youngstown, and elsewhere in the Mahoning Valley business has largely been interrupted.

### **Boston**

Any softness in Pittsburgh heavy melting steel prices is not reflected here because there is no buying. However, bundled skeleton for Pennsylvania delivery is now quoted at \$11 to \$11.25 a ton on cars, as against \$11.75 heretofore, and consumers have notified brokers the next time they buy steel turnings the price will be \$8.10 a ton on cars, contrasted with \$9 to \$9.25, the current quotation. The American Steel & Wire Co. the past

week took additional small tonnages of No. 1 heavy melting steel at \$14.75 a ton delivered, and No. 2 steel at \$13.25. The export market continues active at \$16 a ton delivered for No. 1 steel, and at \$15 for No. 2. Buying of stove plate and No. 2 cast has not developed.

### **Buffalo**

The largest consumer has continued to pick up No. 1 heavy melting steel at \$17.50, new hydraulic compressed sheets at \$16; old bundles at \$14.50. It is able to get drop forge flashings and No. 2 heavy melting steel at \$15.50. Scrap shipments are flooding into local mills. One interest estimates it is unloading 30,000 tons a month, and on one occasion recently has 150 loaded cars on track. A slightly stiffening tendency was noted in a reported purchase by a Buffalo mill of a medium-sized tonnage of No. 2 heavy melting steel at \$16.50.

### **Cincinnati**

The old materials market is listless. Dealer activity is limited to purchases for old commitments and occasionally for yard supplies. Prices are unchanged and untested. Hope, however, is still strong, and the trade is holding material in anticipation of heavy mill buying which is believed to be imminent.

### **New York**

The New York market still remains in the doldrums, and prices are practically nominal in the face of no important mill commitments. Future action of the market depends upon the outcome of the strikes in the steel mills. A stronger undertone has developed in heavy breakable cast, however, and dealers have raised their buying prices to \$14.50 in order to draw out sufficient material to supply a Harrisburg, Pa., consumer. Movement of export tonnages is large, and the congestion of barges in the harbor is being relieved from week to week.

### **St. Louis**

An East Side steel mill bought 8000 to 10,000 tons of heavy melting steel during the week at current levels, which was the first sizable sale in several months. Prices are unchanged.

### **Detroit**

Apparently on the bottom of its curve, the Detroit scrap market shows no change in quotations this week. The market has been unusually quiet, but the very few sales that have been made have been consistent with present quotations. General opinion is that the low point has been hit and that an upswing will follow any optimistic note on the labor situation. It is understood that body company bundles sold during last week brought a top price of \$16 or slightly better. Scrap yard operators and the union have reached a tentative agreement on hours and wages, and signatures should be placed on union contracts this Thursday.



# Iron and Steel Scrap Prices

## PITTSBURGH

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
Railroad hvy. mltng.	19.50 to 20.00
No. 2 hvy. mltng. steel.	16.00 to 16.50
No. 2 RR. wrought	18.00 to 18.50
Scrap rails	20.50 to 21.00
Rails 3 ft. and under	24.00 to 24.50
Comp. sheet steel	18.00 to 18.50
Hand bundled sheets	16.00 to 16.50
Hvy. steel axle turn.	16.25 to 16.75
Machine shop turn.	13.50 to 14.00
Short shov. turn.	14.50 to 15.00
Mixed bor. & turn.	14.50 to 15.00
Cast iron borings	14.50 to 15.00
Cast iron carwheels	18.50 to 19.00
Hvy. breakable cast.	14.50 to 15.00
No. 1 cupola cast.	18.00 to 18.50
RR. knuckles & cplrs.	24.00 to 24.50
Rail coil & leaf springs	24.00 to 24.50
Rolled steel wheels	24.00 to 24.50
Low phos. billet crops	24.50 to 25.00
Low phos. sh. bar	23.50 to 24.00
Low phos. punchings	22.00 to 22.50
Low phos. plate, hvy.	23.00 to 23.50
Low phos. plate clips	21.00 to 21.50
Steel car axles	24.00 to 24.50

## CLEVELAND

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	16.00 to 16.50
Comp. sheet steel	16.50 to 17.00
Light bund. stampings	12.50 to 13.00
Drop forge flashings	15.50 to 16.00
Machine shop turn.	11.00 to 11.50
Short shov. turn.	12.00 to 12.50
No. 1 busheling	15.50 to 16.00
Steel axle turnings	13.50 to 14.00
Low phos. billet and bloom crops	23.50 to 24.50
Cast iron borings	12.50 to 13.00
Mixed bor. & turn.	12.50 to 13.00
No. 2 busheling	12.50 to 13.00
No. 1 cast	19.00 to 19.50
Railroad grate bars	11.50 to 12.00
Stove plate	9.50 to 10.00
Rails under 3 ft.	23.00 to 23.50
Rails for rollings	21.00 to 21.50
Railroad malleable	20.50 to 21.00
Cast iron carwheels	21.50

## PHILADELPHIA

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	15.00 to 15.50
Hydraulic bund., new	18.00 to 18.50
Hydraulic bund., old	14.50 to 15.00
Steel rails for rolling	21.00 to 21.50
Cast iron carwheels	19.50 to 20.00
Hvy. breakable cast.	18.00 to 18.50
No. 1 cast	20.00 to 20.50
Stove plate (steel wks.)	14.00 to 14.50
Railroad malleable	19.00 to 19.50
Machine shop turn.	13.00 to 13.50
No. 1 blast furnace	12.00 to 12.50
Cast borings	12.50 to 13.00
Heavy axle turnings	15.00 to 15.50
No. 1 low phos. hvy.	23.50 to 24.00
Couplers & knuckles	23.50 to 24.00
Rolled steel wheels	23.00 to 23.50
Steel axles	25.50 to 26.00
Shafting	23.50 to 24.00
No. 1 RR. wrought	19.50 to 20.00
Spec. iron & steel pipe	16.50 to 17.00
No. 1 forge fire	16.00 to 16.50
Cast borings (chem.)	14.00 to 14.50

## CHICAGO

Delivered to Chicago district consumers:	
	Per Gross Ton
Hvy. mltng. steel.	\$15.50 to \$16.00
Auto, hvy. mltng. steel, alloy free	14.50 to 15.00
No. 2 auto. steel	12.00 to 12.50
Shoveling steel	15.50 to 16.00
Hydraul. comp. sheets	14.50 to 15.00
Drop forge flashings	13.50 to 14.00
No. 1 busheling	14.50 to 15.00
Rolled carwheels	19.50 to 20.00
Railroad tires, cut	21.50 to 22.00
Railroad leaf springs	21.00 to 21.50
Steel coup. & knuckles	19.50 to 20.00
Axle turnings	15.00 to 15.50
Coil springs	22.00 to 22.50
Axle turn. (elec.)	15.50 to 16.00
Low phos. punchings	20.00 to 20.50
Low phos. plates, 12 in. and under	20.00 to 20.50
Cast iron borings	10.00 to 10.50
Short shov. turnings	10.50 to 11.00
Machine shop turn.	8.50 to 9.00
Rerolling rails	19.00 to 19.50
Steel rails under 3 ft.	19.50 to 20.00
Steel rails under 2 ft.	20.00 to 20.50
Angle bars, steel	19.00 to 19.50
Cast iron carwheels	18.00 to 18.50
Railroad malleable	19.00 to 19.50
Agric. malleable	15.50 to 16.00

## Per Net Ton

Iron car axles	\$24.50 to \$25.00
Steel car axles	21.50 to 22.00
No. 1 RR. wrought	14.00 to 15.00
No. 2 RR. wrought	14.00 to 15.00
No. 2 busheling, old	8.50 to 9.00
Locomotive tires	18.00 to 18.50
Pipes and flues	13.50 to 14.00
No. 1 machinery cast.	15.00 to 15.50
Clean auto. cast.	14.00 to 14.50
No. 1 railroad cast.	14.00 to 14.50
No. 1 agric. cast.	13.00 to 13.50
Stove plate	10.50 to 11.00
Grate bars	12.00 to 12.50
Brake shoes	11.00 to 11.50

## BUFFALO

Per gross ton, f.o.b. consumers' plants:	
No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	15.50 to 16.00
Scrap rails	18.50 to 19.00
New hvy. b'ndled sheet	15.50 to 16.00
Old hydraulic bundles	15.00 to 15.50
Drop forge flashings	15.50 to 16.00
No. 1 busheling	15.50 to 16.00
Hvy. axle turnings	13.00 to 13.50
Machine shop turn.	11.00 to 11.50
Knuckles & couplers	20.00 to 21.00
Coil & leaf springs	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
Low phos. billet crops	20.50 to 21.00
Shov. turnings	12.00 to 12.50
Mixed bor. & turn.	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Steel car axles	19.50 to 20.00
No. 1 machinery cast.	17.50 to 18.00
No. 1 cupola cast.	16.50 to 17.00
Stove plate	14.00 to 14.50
Steel rails under 3 ft.	20.50 to 21.50
Cast iron carwheels	16.50 to 17.00
Railroad malleable	18.50 to 19.00
Chemical borings	11.00 to 11.50

## BIRMINGHAM

Per gross ton delivered to consumer:	
Hvy. melting steel	\$16.00 to \$16.50
Scrap steel rails	17.00
Short shov. turnings	9.00 to 10.00
Stove plate	10.00
Steel axles	18.00 to 19.00
Iron axles	16.50 to 18.00
No. 1 RR. wrought	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 18.00

## ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	
Selected hvy. steel	\$15.00 to \$15.50
No. 1 hvy. melting	15.00 to 15.50
No. 2 hvy. melting	13.50 to 14.00
No. 1 locomotive tires	18.50 to 19.00
Misc. stand.-sec. rails	16.75 to 17.25
Railroad springs	20.00 to 20.50
Bundled sheets	10.00 to 10.50
No. 2 RR. wrought	15.00 to 15.50
No. 1 busheling	12.00 to 12.50
Cast bor. & turn.	7.50 to 8.00
Rails for rolling	18.00 to 18.50
Machine shop turn.	9.00 to 9.50
Heavy turnings	12.00 to 12.50
Steel car axles	21.50 to 22.00
Iron car axles	22.00 to 22.25
No. 1 RR. wrought	12.00 to 12.50
Steel rails under 3 ft.	18.50 to 19.00
Steel angle bars	17.50 to 18.00
Cast iron carwheels	18.00 to 18.50
No. 1 machinery cast.	14.00 to 14.50
Railroad malleable	18.00 to 18.50
No. 1 railroad cast.	14.00 to 14.50
Stove plate	11.50 to 12.00
Agric. malleable	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	12.25 to 12.75

## CINCINNATI

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.25 to \$14.75
No. 2 hvy. mltng. steel.	11.75 to 12.25
Scrap rails for mltng.	17.50 to 18.00
Loose sheet clippings	10.25 to 10.75
Hydraul. b'ndled sheets	13.75 to 14.25
Cast iron borings	8.00 to 8.50
Machine shop turn.	8.50 to 9.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	6.00 to 6.50
Rails for rolling	19.50 to 20.00
No. 1 locomotive tires	15.50 to 16.00
Short tails	19.50 to 20.00
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast.	14.00 to 14.50
No. 1 railroad cast.	14.00 to 14.50
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Agric. malleable	15.00 to 15.50
Railroad malleable	16.25 to 16.75
Mixed hvy. cast.	12.00 to 12.50

## DETROIT

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Borings and turnings	10.00 to 10.50
Long turnings	9.25 to 9.75
Short shov. turnings	10.25 to 10.75
No. 1 machinery cast.	15.00 to 15.50
Automotive cast	15.50 to 16.00
Hydraul. comp. sheets	15.50 to 16.00
Stove plate	9.50 to 10.00
New factory bushel.	14.00 to 14.50
Old No. 2 busheling	9.50 to 10.00
No. 2 busheling (black fender stock)	11.50 to 12.00
Sheet clippings	10.50 to 11.00
Flashings	13.25 to 13.75
Low phos. plate scrap.	14.50 to 15.00

## YOUNGSTOWN

Per gross ton delivered to consumer:	
No. 1 hvy. mltng. steel.	\$18.00 to \$18.50
Hydraulic bundles	17.50 to 18.00
Machine shop turn.	12.50 to 13.00

## NEW YORK

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$14.50 to \$15.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Hvy. breakable cast.	14.00 to 14.50
No. 1 machinery cast.	15.00 to 15.50
No. 2 cast	14.00 to 14.50
Stove plate	11.00 to 11.50
Steel car axles	24.50 to 25.50
Shafting	19.00 to 19.50
No. 1 RR. wrought	17.00 to 17.50
No. 1 wrought long.	16.00 to 16.50
Spec. iron & steel pipe	12.50 to 13.00
Rails for rolling	18.50 to 19.00
Clean steel turnings	9.00 to 9.50
Cast borings	9.50 to 10.00
No. 1 blast furnace	9.50 to 10.00
Cast borings (chem.)	12.00 to 12.50
Unprepar. yard scrap.	9.00 to 9.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast.	\$17.50 to \$18.00
No. 1 hvy. cast cupola.	15.00 to 15.50
No. 2 cast	14.50 to 15.00

## BOSTON

Dealers' buying prices per gross ton:	
No. 1 hvy. mltng. steel.	\$13.30
Scrap rails	13.30
No. 2 steel	12.25
Breakable cast.	13.10
Machine shop turn.	\$9.00 to 9.50
Mixed bor. & turn.	9.00 to 9.50
Bund. skeleton long.	11.00 to 11.25
Shafting	18.00 to 18.50
Cast bor. chemical	9.50 to 10.25
Per gross ton delivered consumers' yards:	
Textile cast	\$17.00 to \$19.00
No. 1 machine cast.	18.00 to 19.00
Stove plate	10.00 to 10.50

## CANADA

Dealers' buying prices at their yards, per gross ton	
	Toronto Montreal
No. 1 hvy. mltng. stl.	\$12.50 \$13.00
No. 2 hvy. mltng. stl.	11.50 12.00
Mixed dealers steel	11.00 11.75
Scrap pipe	10.00 9.75
Steel turnings	8.00 8.50
Cast borings	9.25 9.50
Machinery cast.	16.00 17.00
Dealers cast.	14.00 15.00
Stove plate	12.00 12.75

## EXPORT

Dealers' buying prices per gross ton:	
New York, truck lots, delivered, barges.	
No. 1 hvy. mltng. steel.	\$15.00
No. 2 hvy. mltng. steel.	14.00
No. 2 cast	13.00
Stove plate	11.00

## Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	\$16.00
No. 2 hvy. mltng. steel.	15.00
Rails (scrap)	16.00

## Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	\$17.00*
No. 2 hvy. mltng. steel	15.00*

\* Nominal.

## New Orleans, f.a.s., Stuyvesant Dock

No. 1 hvy. mltng. steel.	\$17.50
No. 2 hvy. mltng. steel.	16.50

## Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	\$10.50 to \$11.00
Compressed bundles	8.50 to 9.00



# PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

## SEMI-FINISHED STEEL

### Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton  
 Rerolling ..... \$37.00  
 Forging quality ..... 43.00

### Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton  
 Open-hearth or Besse-  
 mer ..... \$37.00

### Skelp

F.o.b. Pittsburgh, Chicago, Youngs-  
 town, Buffalo, Coatesville, Pa., Spar-  
 rows Point, Md.

Per Lb.  
 Grooved, universal and  
 sheared ..... 2.10c.

### Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton  
 F.o.b. Pittsburgh or Cleveland \$47.00  
 F.o.b. Chicago, Youngstown or  
 Anderson, Ind. .... 48.00  
 F.o.b. Worcester, Mass. .... 49.00  
 F.o.b. Birmingham ..... 50.00  
 F.o.b. San Francisco ..... 56.00  
 F.o.b. Galveston ..... 53.00  
 Rods over 9/32 in. to 47/64 in., in-  
 clusive, \$5 a ton over base.

## BARS, PLATES, SHAPES

### Iron and Steel Bars

#### Soft Steel

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.45c.  
 F.o.b. Chicago or Gary ..... 2.50c.  
 F.o.b. Duluth ..... 2.60c.  
 Del'd Detroit ..... 2.60c.  
 F.o.b. Cleveland ..... 2.50c.  
 F.o.b. Buffalo ..... 2.55c.  
 Del'd Philadelphia ..... 2.74c.  
 Del'd New York ..... 2.78c.  
 F.o.b. Birmingham ..... 2.60c.  
 F.o.b. cars dock Gulf ports... 2.85c.  
 F.o.b. cars Pacific Ports..... 3.00c.

#### Rail Steel

(For merchant trade)

F.o.b. Pittsburgh ..... 2.30c.  
 F.o.b. Cleveland, Chicago, Gary  
 or Moline, Ill. .... 2.35c.  
 F.o.b. Buffalo ..... 2.40c.  
 F.o.b. Birmingham ..... 2.45c.  
 F.o.b. cars dock Gulf ports... 2.70c.  
 F.o.b. cars dock Pacific ports.. 2.85c.

Billet Steel Reinforcing  
 (Straight lengths as quoted by  
 distributors)

F.o.b. Pittsburgh ..... 2.55c.  
 F.o.b. Buffalo, Cleveland,  
 Youngstown, Chicago, Gary  
 or Birmingham ..... 2.60c.  
 Del'd Detroit ..... 2.70c.  
 F.o.b. cars dock Gulf ports... 2.95c.  
 F.o.b. cars dock Pacific ports.. 2.95c.

Rail Steel Reinforcing  
 (Straight lengths as quoted by  
 distributors)

F.o.b. Pittsburgh ..... 2.40c.  
 F.o.b. Buffalo, Cleveland,  
 Youngstown, Chicago, Gary  
 or Birmingham ..... 2.45c.  
 F.o.b. cars dock Gulf ports... 2.80c.  
 F.o.b. cars dock Pacific ports.. 2.80c.

### Iron

F.o.b. Chicago ..... 2.40c.  
 F.o.b. Pittsburgh (refined) .... 3.60c.

#### Cold Finished Bars and Shafting\*

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.90c.  
 F.o.b. Cleveland, Chicago and  
 Gary ..... 2.95c.  
 F.o.b. Buffalo ..... 3.00c.  
 F.o.b. Detroit ..... 2.95c.

\* In quantities of 10,000 to 19,999 lb.

### Plates

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.25c.  
 F.o.b. Chicago or Gary ..... 2.30c.  
 Del'd Cleveland ..... 2.435c.  
 F.o.b. Coatesville or Spar. Pt. 2.35c.  
 Del'd Philadelphia ..... 2.435c.  
 Del'd New York ..... 2.53c.  
 F.o.b. Birmingham ..... 2.40c.

F.o.b. cars dock Gulf ports... 2.65c.  
 F.o.b. cars dock Pacific ports.. 2.80c.  
 Wrought iron plates, f.o.b.  
 Pittsburgh ..... 3.80c.

### Floor Plates

F.o.b. Pittsburgh ..... 3.80c.  
 F.o.b. Chicago ..... 3.85c.  
 F.o.b. Coatesville ..... 3.90c.  
 F.o.b. cars dock Gulf ports... 4.20c.  
 F.o.b. cars dock Pacific ports.. 4.35c.

### Structural Shapes

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.25c.  
 F.o.b. Chicago ..... 2.30c.  
 Del'd Cleveland ..... 2.435c.  
 F.o.b. Buffalo or Bethlehem.. 2.35c.  
 Del'd Philadelphia ..... 2.455c.  
 Del'd New York ..... 2.5025c.  
 F.o.b. Birmingham (standard) 2.40c.  
 F.o.b. cars dock Gulf ports... 2.65c.  
 F.o.b. cars dock Pacific ports.. 2.80c.

### Steel Sheet Piling

Base per Lb.  
 F.o.b. Pittsburgh ..... 2.60c.  
 F.o.b. Chicago or Buffalo ..... 2.70c.  
 F.o.b. cars dock Gulf or Pacific  
 Coast ports ..... 3.05c.

## RAILS AND TRACK SUPPLIES

### F.o.b. Mill

Standard rails, heavier than  
 60 lb., per gross ton ..... \$42.50  
 Angle bars, per 100 lb. .... 2.80

### F.o.b. Basing Points

Light rails (from billets) per  
 gross ton ..... \$43.00  
 Light rails (from rail steel) per  
 gross ton ..... 42.00

### Base per Lb.

Spikes ..... 3.15c.  
 Tie plates, steel ..... 2.30c.  
 Tie plates, Pacific Coast ports.. 2.40c.  
 Track bolts, to steam railroads. 4.35c.  
 Track bolts, to jobbers, all sizes  
 (per 100 counts)

65-5 per cent off list  
 Basing points on light rails are Pittsburgh,  
 Chicago and Birmingham; on spikes and tie  
 plates, Pittsburgh, Chicago, Portsmouth, Ohio,  
 Weirton, W. Va., St. Louis, Kansas City,  
 Minnequa, Colo., Birmingham and Pacific Coast  
 ports; on tie plates alone, Steelton, Pa.,  
 Buffalo; on spikes alone, Youngstown, Lebanon,  
 Pa., Richmond, Va.

## SHEETS, STRIP, TIN PLATE

### TERNE PLATE

#### Sheets

#### Hot Rolled

Base per Lb.  
 No. 10, f.o.b. Pittsburgh ..... 2.40c.  
 No. 10, f.o.b. Gary ..... 2.50c.  
 No. 10, del'd Detroit ..... 2.60c.  
 No. 10, del'd Philadelphia ..... 2.69c.  
 No. 10, f.o.b. Granite City ..... 2.60c.  
 No. 10, f.o.b. Birmingham ..... 2.55c.  
 No. 10, f.o.b. cars dock Pacific  
 ports ..... 2.95c.  
 No. 10 wrought iron, Pgh..... 4.25c.

#### Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh ..... 3.15c.  
 No. 24, f.o.b. Gary ..... 3.25c.  
 No. 24, del'd Detroit ..... 3.35c.  
 No. 24, del'd Philadelphia ..... 3.44c.  
 No. 24, f.o.b. Granite City ..... 3.35c.  
 No. 24, f.o.b. Birmingham ..... 3.30c.  
 No. 24, f.o.b. cars dock Pacific  
 ports ..... 3.80c.  
 No. 24 wrought iron, Pitts-  
 burgh ..... 5.15c.

#### Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh. 3.10c.  
 No. 10 gage, f.o.b. Gary ..... 3.20c.  
 No. 10 gage, f.o.b. Detroit ..... 3.30c.  
 No. 10 gage, del'd Philadelphia. 3.39c.  
 No. 10, f.o.b. Granite City ..... 3.30c.  
 No. 10 gage, f.o.b. Birmingham. 3.25c.  
 No. 10 gage, f.o.b. cars dock  
 Pacific ports ..... 3.70c.

#### Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh.. 3.55c.  
 No. 20 gage, f.o.b. Gary ..... 3.65c.  
 No. 20 gage, del'd Detroit ..... 3.75c.  
 No. 20 gage, del'd Philadelphia. 3.84c.  
 No. 20, f.o.b. Granite City ..... 3.75c.  
 No. 20 gage, f.o.b. Birmingham 3.70c.  
 No. 20 gage, f.o.b. cars, dock,  
 Pacific ports ..... 4.10c.

#### Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh. 3.80c.  
 No. 24, f.o.b. Gary ..... 3.90c.  
 No. 24, del'd Philadelphia ..... 4.09c.  
 No. 24, f.o.b. Granite City ..... 4.00c.

No. 24, f.o.b. Birmingham ..... 3.95c.  
 No. 24, f.o.b. cars, dock, Pacific  
 ports ..... 4.40c.  
 No. 24, wrought iron, Pitts-  
 burgh ..... 6.10c.

### Electrical Sheets (F.o.b. Pittsburgh)

#### Base per Lb.

Field grade ..... 3.35c.  
 Armature ..... 3.70c.  
 Electrical ..... 4.20c.  
 Special Motor ..... 5.10c.  
 Special Dynamo ..... 5.80c.  
 Transformer ..... 6.30c.  
 Transformer Special ..... 7.30c.  
 Transformer Extra Special ..... 7.80c.

Base gage changed from 28 to 24 gage. Gage  
 extras are the same as those applying on hot-  
 rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus sil-  
 icon sheet extra width extra plus 25c. per 100  
 lb. for coils.

### Long Ternes

No. 24, unassorted 8-lb. coating  
 f.o.b. Pittsburgh ..... 4.10c.  
 F.o.b. Gary ..... 4.20c.  
 F.o.b. cars, dock, Pacific ports 4.80c.

### Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh ..... 3.50c.  
 No. 20, f.o.b. Gary ..... 3.60c.  
 No. 20, f.o.b. Granite City ..... 3.70c.  
 No. 20, f.o.b. cars dock Pacific  
 ports ..... 4.10c.

### Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per  
 lb. .... 3.30c.  
 No. 28, Gary ..... 3.40c.  
 No. 28, f.o.b. Granite City... 3.50c.  
 No. 28, cars dock Pacific ports,  
 boxed ..... 4.175c.

### Tin Plate

#### Base per Box

Standard cokes, f.o.b. Pitts-  
 burgh district mill ..... \$5.35  
 Standard cokes, f.o.b. Gary ..... 5.45  
 Standard coke, f.o.b. Granite  
 City ..... 5.55

Above quotations practically the  
 equivalent of previous quotations  
 owing to new method of quoting,  
 effective Jan. 1, 1937.

### Special Coated Manufacturing Ternes

#### Base per Box

F.o.b. Pittsburgh ..... \$4.65  
 F.o.b. Gary ..... 4.75  
 F.o.b. Granite City ..... 4.85

\* Customary 7½ per cent discount in effect  
 through 1936 discontinued as of Jan. 1, 1937.

### Terne Plate

#### (F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)  
 8-lb. coating I.C. .... \$11.00  
 15-lb. coating I.C. .... 13.00  
 20-lb. coating I.C. .... 14.00  
 25-lb. coating I.C. .... 15.00  
 30-lb. coating I.C. .... 16.25  
 40-lb. coating I.C. .... 18.50

### Hot-Holed Hoops, Bands, Strip and Flats under ¼ in.

Base per Lb.  
 All widths up to 24 in., Pitts-  
 burgh ..... 2.40c.  
 All widths up to 24 in., Chicago 2.50c.  
 All widths up to 24 in., del'd  
 Detroit ..... 2.60c.  
 All widths up to 24 in., Granite  
 City ..... 2.60c.  
 All widths up to 24 in.,  
 Birmingham ..... 2.55c.  
 Cooperage stock, Pittsburgh... 2.60c.  
 Cooperage stock, Chicago .... 2.60c.

### Cold-Rolled Strip\*

#### Base per Lb.

F.o.b. Pittsburgh ..... 3.20c.  
 F.o.b. Cleveland ..... 3.20c.  
 Del'd Chicago ..... 3.48c.  
 F.o.b. Worcester ..... 3.40c.

\* Carbon 0.25 and less.

### Cold Rolled Spring Steel

#### Pittsburgh

#### and

#### Cleveland Worcester

Carbon 0.25-0.50% 3.20c. 3.40c.  
 Carbon .51-.75 4.45c. 4.65c.  
 Carbon .76-1.00 6.80c. 6.50c.  
 Carbon Over 1.00 8.50c. 8.70c.

### Fender Stock

No. 14, Pittsb'gh or Cleveland 3.45c.  
 No. 20, Pittsb'gh or Cleveland. 3.85c.

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

### To Manufacturing Trade

	Per Lb.
Bright wire .....	2.90c.
Spring wire .....	3.50c.
Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.	

### To the Trade

	Base per Keg
Standard wire nails .....	\$2.75
Smooth coated nails .....	\$2.75
Cut nails, carloads .....	\$3.60

### Base per 100 Lb.

Annealed fence wire .....	\$3.20
Galvanized fence wire .....	3.60
Polished staples .....	3.45
Galvanized staples .....	3.70
Barbed wire, galvanized .....	3.40
Twisted barbed wire .....	3.40
Woven wire fence, base column. 74	
Single loop bale ties, base col....	63
Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh, except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.	

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

## STEEL AND WROUGHT IRON PIPE AND TUBING

### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

### Butt Weld

In.	Steel Black Galv.	In.	Wrought Iron Black Galv.
1/8	52 31	1/8	52 31
1/4	55 38 1/2	1/4	55 38 1/2
3/8	59 49	3/8	59 49
1/2	62 53	1/2	62 53
3/4	64 55 1/2	3/4	64 55 1/2
1 to 3	64 55 1/2	1 to 3	64 55 1/2

### Lap Weld

2	57 47 1/2	2	57 47 1/2
2 1/2	60 50 1/2	2 1/2	60 50 1/2
3 1/2	62 52 1/2	3 1/2	62 52 1/2
7 & 8	61 51 1/2	7 & 8	61 51 1/2
9 & 10	60 50 1/2	9 & 10	60 50 1/2
11 & 12	59 49 1/2	11 & 12	59 49 1/2

### Butt Weld, extra strong, plain ends

1/8	50 36 1/2	1/8	50 36 1/2
1/4	52 38 1/2	1/4	52 38 1/2
3/8	57 48 1/2	3/8	57 48 1/2
1/2	61 52 1/2	1/2	61 52 1/2
3/4	63 55	3/4	63 55
1 to 3	63 55	1 to 3	63 55

### Lap Weld, extra strong, plain ends

2	55 46 1/2	2	55 46 1/2
2 1/2	58 49 1/2	2 1/2	58 49 1/2
3 1/2	60 51 1/2	3 1/2	60 51 1/2
7 & 8	61 51 1/2	7 & 8	61 51 1/2
9 & 10	60 50 1/2	9 & 10	60 50 1/2
11 & 12	59 49 1/2	11 & 12	59 49 1/2

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

### Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold Drawn	Hot Rolled
1 in. o.d. ....	13 B.W.G. \$ 9.46	\$ 8.41
1 1/4 in. o.d. ....	13 B.W.G. 11.21	9.96
1 1/2 in. o.d. ....	13 B.W.G. 12.38	11.00
1 3/4 in. o.d. ....	13 B.W.G. 14.09	12.51
2 in. o.d. ....	13 B.W.G. 15.78	14.02
2 1/4 in. o.d. ....	13 B.W.G. 17.60	15.63
2 1/2 in. o.d. ....	12 B.W.G. 19.37	17.21
2 3/4 in. o.d. ....	12 B.W.G. 21.22	18.85
3 in. o.d. ....	12 B.W.G. 22.49	19.98
3 1/4 in. o.d. ....	12 B.W.G. 23.60	20.97
3 1/2 in. o.d. ....	10 B.W.G. 45.19	40.15
3 3/4 in. o.d. ....	11 B.W.G. 29.79	26.47
4 in. o.d. ....	10 B.W.G. 36.96	32.83
5 in. o.d. ....	9 B.W.G. 56.71	50.38
6 in. o.d. ....	7 B.W.G. 87.07	77.35

Extra for less-carload quantities:  
25,000 lb. or ft. to 39,999 lb. or ft. 5 %  
12,000 lb. or ft. to 24,999 lb. or ft. 12 1/2 %  
6,000 lb. or ft. to 11,999 lb. or ft. 25 %  
2,000 lb. or ft. to 5,999 lb. or ft. 35 %  
Under 2,000 lb. or ft. .... 50 %

## CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	\$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham.	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles.	56.00
F.o.b. dock, Seattle.	56.00
4-in., f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, \$3 extra.  
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$46, Birmingham, and \$54 delivered Chicago; and 4-in. pipe, \$49, Birmingham, and \$58 delivered Chicago.

## BOLTS, NUTS, RIVETS, SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

### Per Cent Off List

Machine and carriage bolts:	
1/2 in. x 6 in. and smaller.	65 and 5*
Larger and longer up to	
1 in. ....	60 and 10*
1 1/2 in. and larger.	60 and 5*
Lag bolts .....	60 and 10*
Plow bolts, Nos. 1, 2, 3	
and 7 .....	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
1/2 in. and smaller.	65
9/16 in. to 1 in. inclusive.	60 and 5
1 1/8 in. and larger	60

Jobbers discount on above items, 5 per cent.

\* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:

1/2 in. and smaller	60 and 10
9/16 in. to 1 in. inclusive.	60 and 5
1 1/8 in. and larger	60
Stove bolts in packages, nuts attached	72 1/2
Stove bolts in packages, with nuts separate	72 1/2 and 5
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

### Large Rivets

(1/2-in. and larger)

### Base per 100 Lbs.

F.o.b. Pittsburgh or Cleveland..\$3.60  
F.o.b. Chicago or Birmingham.. 3.70

### Small Rivets

(7/16-in. and smaller)

### Per Cent Off List

F.o.b. Pittsburgh .....	65 and 5
F.o.b. Cleveland .....	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

### Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

### Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread 1/4 in. and smaller.	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

## Alloy and Stainless Steel

### Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.  
Base price, \$60 a gross ton.

### Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.  
Open-hearth grade, base .....3.00c.  
Delivered, Detroit .....3.15c.

S.A.E. Series	Alloy Differential
Numbers	per 100 lb.
200 (1/2% Nickel)	\$0.35
2100 (1 1/4% Nickel)	0.75
2300 (3 1/2% Nickel)	1.55

2500 (5% Nickel)	\$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum).	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum).	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
5100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

### Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

## CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

### Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

### Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

## TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c a lb. higher.

## British and Continental BRITISH

### Per Gross Ton

f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	24s. to 25s.
Steel bars, open-hearth.	£11
Beams, open-hearth.	£10 12s. 6d.
Channels, open-hearth.	£10 12s. 6d.
Angles, open-hearth.	£10 12s. 6d.
Black sheets, No. 24 gage	£15
Galvanized sheets, No. 24 gage	£18 15s.

## CONTINENTAL

### Per Metric Ton, Gold £.

f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-france exchange.

Billets, Thomas .....£4 7s. 6d.

Wire rods, No. 5 B.W.G. ....£5 2s. 6d.

Steel bars, merchant .....£5

Sheet bars .....£4 8s. 6d.

Plate 1/4 in. and up.....£6 7s.

Plate 3/16 in. and 5 mm. ....£6 13s.

Sheet, 1/4 in. ....£7 9s. 6d.

Beams, Thomas .....£4 18s.

Angles (Basic) .....£4 18s.

Hoops and strip, base ....£6



# IRON AND STEEL WAREHOUSE PRICES

## PITTSBURGH\*

	Per Net Ton
Plates	3.70c.
Structural shapes	3.70c.
Soft steel bars and small shapes	3.80c.
Reinforcing steel bars	3.80c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$4.48
Spikes, large	1 to 24 kegs 3.90c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

\*Delivered in Pittsburgh switching district.

\*\*Prices on application.

## CHICAGO Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	4.40c.
Track bolts (keg lots)	5.60c.
Rivets, structural (keg lots)	4.60c.
Rivets, boiler (keg lots)	4.70c.

## Per Cent Off List

Machine bolts	60
Carriage bolts	60
Lag screws	55 and 5
Hot-pressed nuts, sq. tap or blank	60
Hot-pressed nuts, hex. tap or blank	60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72 1/2
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	\$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	\$4.55
Com. wire nails, 15 kegs or more, per keg	\$3.20
Cement c't'd nails, 15 kegs or more, per keg	\$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

\*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

## NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	6.50 to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.

Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.00 to 5.72c.
Long terme sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, 1/4 in. and heavier	5.90c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x 1/2 in. and larger	4.11c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	\$3.40

## Per Cent Off List

Machine bolts, square head and nut:	
All diameters. Prices on application	
Carriage bolts, cut thread:	
All diameters. Prices on application	

\* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.  
† 125 lb. and more.

## ST. LOUIS Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	4.94c.
Boiler rivets	5.04c.

## Per Cent Off List

Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

\* No. 26 and lighter take special prices.

## PHILADELPHIA

	Base Per Lb.
*Plates, 1/4-in. and heavier	3.80c.
*Structural shapes	3.80c.
*Soft steel bars, small shapes, iron bars (except bands)	3.90c.
†Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.25c.
*Steel bands, No. 12 and 3/16 in. incl.	4.00c.
Spring steel	5.40c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	3.90c.
Diam. pat. floor plates, 1/4 in.	5.45c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

\*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

†For less than 2000 lb.

## CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.86c.

Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
†Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	\$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

Per Cent Off List  
Machine and carriage bolts, small

Large	65 and 5
Nuts, 100 count	65 and 5
1/2 in. and smaller	65 and 5
3/16 in. to 1 in.	60 and 10

†Outside delivery 10c. less.

\*For 5000 lb. or less.

† Plus switching and cartage charges and quantity differentials up to 50c.

## CINCINNATI Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.85c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	\$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	.55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb. keg	3.50
Chain. lin. per 100 lb.	8.35

## Net per 100 Ft.

Seamless steel boiler tubes,	
2-in.	\$21.80
4-in.	52.45
Lap-welded steel boiler tubes,	
2-in.	20.73
4-in.	48.41

## BUFFALO Base per Lb.

Plates	3.92c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	\$3.21
Black wire, base per 100 lb. (2500-lb lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

## BOSTON Base per Lb.

Channels, angles	4.20c.
Tees and zeos, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, 1/4 thick and heavier	4.08c.
Floor plates, diamond pattern	6.03c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.



## DETROIT

Base per Lb.

Soft steel bars	3.94c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets	
(No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	

\* Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

## MILWAUKEE

Base per Lb.

Plates and structural shapes..	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles...	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	4.81c.
Boiler rivets, cone head (keg lots)	4.91c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails	
1 to 14 kegs	3.25c.

Per Cent Off List

Machine bolts and carriage bolts, 1/2x6 and smaller or shorter...	65
Larger and longer up to 1 in. diam.	60-5
1 1/4 in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.	50
200 lb. and over:	
1/2 in. and smaller	65
3/16 to 1 in.	60-5
1 1/4 in. and over	50-10

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

## ST. PAUL

Base per Lb.

Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

## BALTIMORE

Base per Lb.

Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons.	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates 1/4 in. and heavier	5.80c.
Galvanized sheets, No. 24, 100 bdis. or more	\$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	\$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

## CHATTANOOGA

Base per Lb.

Mild steel bars	3.96c.
Iron bars	3.96c.
Reinforcing bars	3.96c.
Structural shapes	4.01c.
Plates	4.01c.
Hot-rolled sheets No. 10	3.91c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.16c.
Cold-finished bars	4.86c.

\* Plus mill item extra.

## MEMPHIS

Base per Lb.

Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	4.35c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	60

## NEW ORLEANS

Base per Lb.

Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	\$3.30
Bolts and nuts, per cent off list	60

## PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	\$3.65	\$3.60	\$3.70

All items subject to differentials for quantity.

## REFRACTORIES PRICES

### Fire Clay Brick

Per 1000 f.o.b. Works

First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00*
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00
5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.	

### Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50
5 per cent trade discount on silica brick.	

### Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

### Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester, Pa.	\$69.00
Chemically bonded, f.o.b. Baltimore	59.00

### Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

## RAW MATERIALS PRICES

### PIG IRON

#### No. 2 Foundry

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.27
Delivered Newark or Jersey City	26.39
Delivered Philadelphia	25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.07
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	25.00
F.o.b. Birmingham*	20.38

\* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

#### Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

#### Basic

F.o.b. Everett, Mass.	\$25.75
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.51
Delivered Canton, Ohio	24.76
Delivered Mansfield, Ohio	25.26
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

#### Bessemer

F.o.b. Everett, Mass.	\$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.39
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.50
Delivered Cincinnati	25.51
Delivered Canton, Ohio	25.76
Delivered Mansfield, Ohio	26.26

#### Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$28.50
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#### Gray Forge

Valley or Pittsburgh furnace	\$23.50
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#### Charcoal

Lake Superior furnace	\$27.00
Delivered Chicago	30.04

#### Canadian Pig Iron

##### Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

### FERROALLOYS

#### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans	
Per Gross Ton	
Domestic, 80% (carload)	\$102.50

#### Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$33.00
F.o.b. New Orleans	33.00

#### Electric Ferroalloy

##### Per Gross Ton Delivered

50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

#### Silvery Iron

Per Gross Ton	
F.o.b. Jackson, Ohio, 5.00 to 5.50%	\$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.  
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.  
Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

#### Bessemer Ferrosilicon

##### F.o.b. Jackson, Ohio, Furnace

##### Per Gross Ton

10.00 to 10.50%	\$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00
Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.	
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.	

#### Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	\$1.70
Ferrotungsten, lots of 5000 lb.	\$1.75
Ferrotungsten, smaller lots	\$1.80
Ferrocromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.50c.*
Ferrocromium, 2% carbon	16.50c. to 17.00c.*
Ferrocromium, 1% carbon	17.50c. to 18.00c.*
Ferrocromium, 0.10% carbon	19.50c. to 20.00c.*
Ferrocromium, 0.06% carbon	20.00c. to 20.50c.*
Ferrovandium, del. per lb. contained V.	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50*
Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$142.50
Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	63.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	80.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

\* Spot prices are \$5 a ton higher. Spot premium on 75 per cent ferrosilicon is \$10 a ton.

### ORES

#### Lake Superior Ores

##### Delivered Lower Lake Ports

Per Gross Ton	
Old range, Bessemer, 51.50%	\$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10

Mesabi, non-Bessemer, 51.50%	\$4.95
High phosphorus, 51.50%	4.85

#### Foreign Ore

##### C.A.F. Philadelphia or Baltimore

##### Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68 1/2% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	47c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48 1/2%	Nominal

##### Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	\$23.50 to \$25.50
Tungsten, domestic, scheelite delivered	Nominal
Chrome ore (lump) c.i.f. Atlantic Seaboard, per net ton:	
South African	\$16.00
Rhodesian, 45%	23.00
Rhodesian, 48%	26.50
Turkish, 48-49%	\$24.50 to \$26.50
Turkish, 45-46%	20.50 to 22.00
Turkish, 44%	19.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
52%	\$25.50 to \$26.00
50%	24.50
48-49%	24.50 to 25.50

### FLUORSPAR

##### Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$20.00
Domestic, barge and rail	\$19.50 to 21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	21.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	35.00

### FUEL OIL

##### Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.75c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

### COKE AND COAL

##### Coke Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	\$4.60 to \$4.75
Foundry, f.o.b. Connellsville, Prompt	5.25 to 6.50
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.85 to 11.30
Foundry, by-product, Philadelphia	10.60
Foundry, by-product, delivered Cleveland	11.00
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

##### Coal Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	\$1.50 to \$1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, 1/4-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45



# NIAGARA

BRAND

## FERRO - ALLOYS

*For High Quality Steels*

**FERRO SILICON**  
ALL GRADES

**FERRO CHROMIUM**  
HIGH CARBON

**FERRO CHROMIUM**  
LOW CARBON

**FERRO MANGANESE**

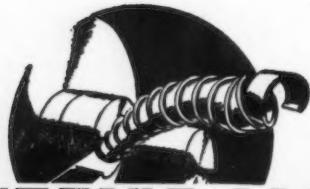
**SILICO MANGANESE**

# PITTSBURGH METALLURGICAL CO., Inc.

NIAGARA FALLS, N. Y.

Sales Offices: NEW YORK—30 Church St. ● PITTSBURGH—Oliver Bldg. ● CLEVELAND—Hanna Bldg.





## THIS WEEK'S MACHINE ... TOOL ACTIVITIES...

... *Automobile expansion plans promise large purchases of machine tools.*

□ □ □

... *General Motors to build \$6,000,000 hardware plant at Trenton, N. J.*

□ □ □

... *Chrysler to build large new plant near Detroit for trucks.*

### Detroit

ERECTOR of a large new Chrysler plant, probably for assembly of a new truck, will be started soon by Chrysler northeast of Detroit. There are also indications that Plymouth may be interested in a similar expansion program for next year. General Motors has officially announced further expansion at its Grand Rapids stamping division and buying is just getting under way in Detroit for the new \$6,000,000 Ternstedt hardware plant at Trenton, N. J. Pontiac is erecting a building at Pontiac for an apprentice-training school and new equipment to the extent of \$100,000 is to be installed before long. It is a definite fact that the Hupp Motor Car Corp., which will begin production of a new car July 1, after having been closed a year and a half, will not replace any of its present equipment for the next year. However, indications are that if it should have its anticipated run of good business, it would be in line for purchase in a year or so, depending upon the kind of model changes that it and its competitors would introduce.

### Cleveland

NEW business this month has fallen off in many instances because of strikes, but orders are being placed against a goodly portion of spring inquiry which has taken this long to materialize, and some manufacturers report incoming business about equal to the May volume. Machinery manufacturers who heretofore were quoting on a price-prevailing-at-time-of-delivery basis on business accepted for shipment in four months or beyond have discontinued this practice in nearly all cases, owing to the resistance of buyers, not because of any slump in demand. Strikes in the steel

and automobile industries have reduced the market for heavier types of machinery, such as presses, although in the past few days a sizable order was placed for presses for the new Chevrolet plant at Tonawanda, N. Y. The bulk of this order, involving about \$200,000 worth of business, was placed with a single manufacturer. Despite the diminished volume of new buying, deliveries fail to show much improvement, and some items cannot be scheduled for shipment before January. Lathes and automatic screw machines are examples. Deliveries in eight to 14 weeks are being offered in other cases. Demand for smaller types of machinery and equipment is spotty, though a wave of strikes affecting considerable numbers of small establishments in the surrounding area has directly interfered with such purchases. Several machine tools will be needed to equip the machine shop of the Industrial Rayon Co. plant at Painesville, Ohio, which plans to install equipment with which to make its own machinery to be used in manufacturing.

### Chicago

NEW orders have been coming in lately at a rate sufficient to cause one seller to predict that this summer's lull will not be as serious as was anticipated several weeks ago. Most of this spurt in business is accountable to an interest in heavy machinery and production equipment, as much as 50 to 60 per cent of one office's current sales being traced to the latter, whereas earlier in the year standard machines were in greater demand. Buying continues in lots of one to three tools rather than in large lists, and this tendency is expected to continue throughout the summer. Steel strikes in this district have had no noticeable effect on tool purchasing.

### New York

THERE has been a noticeable decline in inquiries and orders in the past fortnight, with the exception of those dealers and factory representatives that serve western New York. There activities in the General Motors Corp. dominate the scene at Rochester, Syracuse and Lockport. Although the corporation is to construct a Ternstedt Mfg. (body hardware) division at Trenton, N. J., at a cost in excess of \$6,000,000, the project will bring no machinery business to this market; since this is a unit managed by Fisher Body, the equipment will be purchased in Detroit. Large numbers of light-duty presses, diecasting machines, screw machines and plating equipment will be required.

Railroad buying has shown some promise in recent months. The New York Central bought a number of machines a month ago, and the New Haven has made inquiry for shop equipment. The Southern Railway closed on two turret lathes. R. Hoe & Co., New York, on the strength of an order for four printing presses for *Life* magazine, has bought some additional machinery, including some millers. Improvement in the delivery situation is barely noticeable, and the present lull is welcomed in some quarters.

### Pittsburgh

INQUIRIES are fair and show little change in volume from a week ago. Orders have, however, fallen off considerably, which can be almost entirely attributed to strikes and unsettled labor conditions. When the labor picture is cleared up it is confidently expected that the flow of orders will resume its normal trend. Despite the recent slowing up in new business, machine tool manufacturers have still been unable to improve on their deliveries. It is understood that contracts for machine tools for use in the new machine shop of a large strip mill to be constructed in this district have not as yet been placed, although the trade is expecting some action momentarily.

### Cincinnati

THE machinery market is still encouragingly active, but average business is down to about 80 per cent of the recent volume. Several manufacturers indicate an improvement of European demand for various light machines. In fact, while specific orders are not divulged, they indicate that several multiple unit contracts have been received. The slackening is reported chiefly in domestic business, where labor disputes and normal seasonal influences tend to repress consumer interest.

Plant operations are high, and manufacturers are pressing to catch up with backlogs. Organization of machine tool employees is progressing. No signs of difficulty have yet arisen.

# Plastic Molding Requires Sound Engineering Practice

(CONTINUED FROM PAGE 39)

Hemispheres are produced at the rate of about 4½ per hr. and both polar and equatorial dimensions are held within plus or minus 1/32 in. of the nominal diameter.

To accomplish this, the lower or male half of the globe is placed over a steel cooling ring immediately after removal from the mold. The ring is given exactly the correct dimension to hold the diameter of the globe within the required dimensions when it shrinks in cooling to the size of the ring. When the upper, or female half, is removed from the mold, it is fitted, while still hot, onto the lower half, thus providing a tight shrink fit between the two, assuring the correct dimensions.

In another part of the plant a steaming mask for beauty parlors is shaped roughly to the upper part of the head, but is much larger, measuring 16 in. front to back, 10 in. across and 9½ in. high. It has openings opposite each ear and a small one for a steam connection at the front. Since a large mold is required, and since the cavity must be split to clear the cores forming the openings, a very heavy chase is needed to hold the tapered cavity blocks. In use, steam condenses and runs down the walls of the part. It is caught in a separate U-section molding which fits the lower edge of the mask.

Cleaning or removing flash from molded pieces, as well as any polishing or machining that may be required, is done in a separate department. Small sanding wheels are used for removing fins on some irregularly shaped pieces. These wheels are mounted on motor-driven flexible shafts, arranged for easy manipulation. Much drilling is done on multiple-spindle drills. In some instances, several parts are held in a quick-loading fixture and are then drilled simultaneously. Since small cored holes often have to be freed from fins, it is sometimes more economical to spot them in the molding and drill them as a part of the finishing operation.

Many additional methods followed in this shop might be de-

scribed if space permitted, but those cited are representative of well-planned molding technic. Much

care is exercised initially to see that the parts to be produced are so designed as to lend themselves readily to efficient molding. Well designed and well made molds, careful choice of molding materials, good molding practice, and frequent inspection and testing tend toward efficient, economical production.

## TRIPLE COMPRESSION SCRAP BALERS



STYLE  
**100 TC**  
(100 x 51 x 36)  
and other sizes

Also Regular  
**Double  
Ram Presses**  
in all sizes



### GALLAND-HENNING

MANUFACTURING COMPANY

2724 S. 31st Street Milwaukee, Wisconsin

COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES AND PUMPS

NOTHING ON OUR MINDS BUT—



## DUNBAR BROS. CO.

DIVISION OF ASSOCIATED BRISTOL CONNECTICUT  
SPRING CORPORATION

# Gray Cast Iron

(CONTINUED FROM PAGE 43)

having a very wide range of mechanical properties.

In 1915, aluminum-copper alloys were practically the only standard alloys of aluminum being sand cast and showing tensile strengths of from 15,000 to 20,000 lb. per sq. in. But by 1936 the same copper-

aluminum alloys showed in the "as cast" condition 19,000 to 22,000 lb. per sq. in. tensile strength, 1 to 2 per cent elongation in 2 in., with a Brinell hardness of from 50 to 70. In addition to this advance in foundry technique in the production of aluminum-copper alloy cast-

ings, there occurred further metallurgical advance in the heat-treatment of sand cast aluminum-copper alloys yielding castings with minimum tensile strength of 30,000 lb. per sq. in. combined with 3 per cent elongation in 2 in., and Brinell hardnesses of 70 to 90.

A further advance in the light alloys of the non-ferrous class is the development of the magnesium base alloys which includes the magnesium-aluminum alloy containing roughly 90 per cent magnesium and 10 per cent aluminum, with tensile strength of 25,000 lb. per sq. in., an elongation of 4 per cent in 2 in., and a Brinell hardness of 55. With these high strengths and the light weight of this alloy, considerable can be done by the designing engineer.

## Engineer and Foundryman

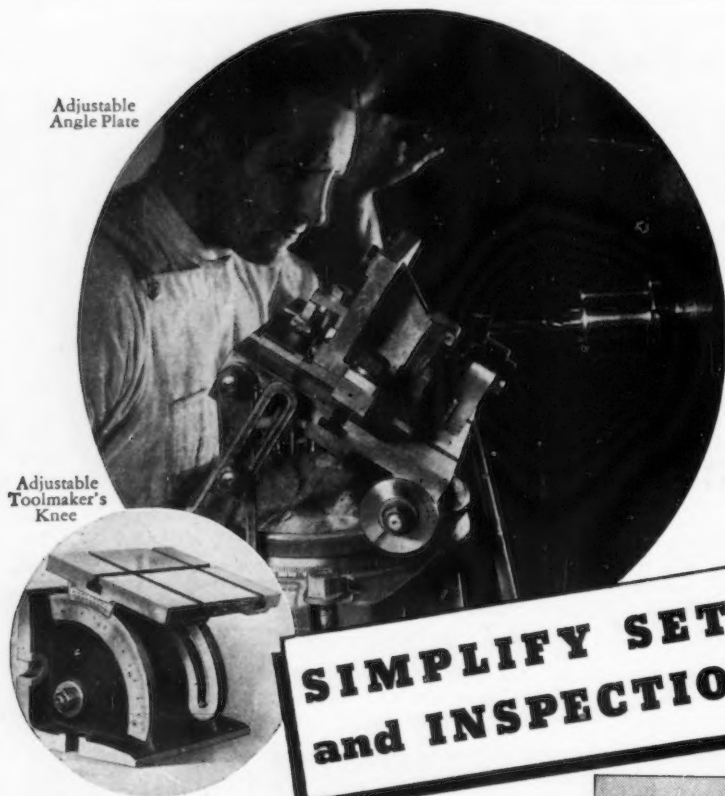
With these cast metal developments during the past years, it becomes necessary that there be some cooperation between the engineer and the foundryman so that the engineer may take proper advantage of these developments, and, also, so that the foundryman may see wherein these developments are satisfactory or unsatisfactory.

It is not necessary that the foundryman become a designer nor that the engineer become a foundryman. It is only necessary that the two become a little better acquainted and become a bit better grounded in the work of each other. There is a marked tendency among foundrymen to attempt to produce castings from designs or patterns as submitted without calling to the attention of the designer those particular points which make for high production costs and high rejections. This tendency leaves the designer ignorant of economics which might be effected and leaves him in this position where the same errors are made on the next succeeding design.

In considering the various alloys which might be used for any particular part, the designer must be primarily influenced by the physical characteristics of the alloy such as strength, hardness, resistance to wear or anti-frictional properties, corrosion-resistance, color, weight, polishing qualities, heat-resisting qualities, etc. Where the demand calls for a combination of a number of these various characteristics at one time, the designer finds it

Adjustable Angle Plate

Adjustable Toolmaker's Knee



**SIMPLIFY SET-UP  
and INSPECTION...**

## WITH THESE *Standardized* TOOLROOM SPECIALTIES

ATTENTION: TOOLROOM FOREMEN, INSPECTORS, TOOLMAKERS, JOB SHOPS. Unusual jobs are common at Taft-Peirce. And such jobs have resulted in the development of many shop accessories that have a wide range of application that offer new opportunities to save time and work, improve accuracy, increase machine utility. These devices are standardized, put in production and stocked—taken out of the range of "special prices."

A few of these set-up and inspection tools are shown. An adjustable angle plate for quick, accurate setting of compound angles. An adjustable toolmaker's knee for checking angular work. A sine block that combines the features of a sine bar and right angle iron. A bench center that permits work to be held, spring center withdrawn, with one hand. And the finest magnetic chuck that money can buy. Also: Sine Bars. V Blocks. Parallels. Squares. Straight Edges. Surfaces Plates. Bench Blocks. Dial Indicators. Write for prices.

MAGNETIC CHUCK



BENCH CENTER



SINE BLOCK

**THE TAFT-PEIRCE MFG. CO.**

WOONSOCKET  RHODE ISLAND



necessary to compromise. Other important factors, however, which the designer should consider aside from the physical properties of the finished product are the cost of the metal or alloy to be used, the foundries available for producing it, and the particular facilities of the particular foundries available. In non-ferrous castings, for example, the material cost is of considerable importance as it often makes up a very high percentage of the total cost of the casting. In cases where material cost is of importance, the designer must pay additional attention to having the casting of minimum weight. If the alloy selected, however, is one which has high shrinkage, then the production of the casting requires the use of excessive risers and suitable heavy feeds. In such cases, the weight of the casting as shipped very often is only a small percentage of the weight of metal which must be poured into the mold. The cost of producing this casting is, therefore, correspondingly higher per pound of finished casting. Alloys requiring special manipulation in the foundry, special equipment, special foundry technique and so forth, should not be specified by the designer unless the particular foundry to which the job is to be submitted is thoroughly familiar with the problems involved and is prepared to meet them. This is simply another example of where close cooperation is necessary between the foundryman and the designing engineer.

## Garlock Packing Co. 50 Years Old

THE Garlock Packing Co., Palmyra, N. Y., manufacturer of mechanical packings, is celebrating its 50th anniversary. Founded in 1887 with a handful of employees, the company started the first manufacture of mechanical packings on a commercial basis. Today the company has grown to an organization of over 1000 employees, with four domestic plants and one Canadian factory.

## Aircraft Production \$78,148,893 in 1936

THE civil aeronautics industry in the United States produced aircraft, engines, equipment and spare parts valued at \$78,148,893 in 1936,

and furnished employment for more than 30,000 persons, according to the Bureau of Air Commerce, Department of Commerce. The value of airplanes and parts was \$47,531,565. The total production of 3,010 airplanes was nearly double that of 1935.

Tiny tablets of sodium chloride are being used in the Gary works of Carnegie-Illinois Steel Corp. to guard against heat prostration, according to Dr. Frank W. Merritt,

chief medical officer. Thousands of dollars once were spent for lemons during the summer months, but it was found that heat cases resulted from the loss of salt from the body during excessive perspiration, so this means of restoring the substance was devised. Manual laborers sometimes lose as much as six grams hourly, which is accompanied by the loss of about four pints of water through perspiration, whereas a man at leisure would normally lose only about one pint each 24 hrs.



**Combining  
Stamping and Welding**

lowers die cost and makes it possible to gain benefit of rolled steel strength for small quantity purchases.

The channel of this inclinator frame is pressed steel 3' deep and  $\frac{1}{8}$ ' thick. The lugs and bosses are welded in place.

Parish engineers consider all phases of the problem; appearance, strength, improved design, and production methods leading to minimum costs.

**PARISH PRESSED STEEL CO.**  
Reading, Pa.

PACIFIC COAST REPRESENTATIVE  
F. Somers Peterson Co., 57 California St.  
San Francisco, Cal.

**PARISH**  
*Specialists in*  
**STAMPINGS**  
*of Distinction*



# PLANT EXPANSION AND EQUIPMENT BUYING

## ◀ NORTH ATLANTIC ▶

**Southern Kraft Corp.**, 220 East Forty-second Street, New York, a subsidiary of International Paper & Power Co., same address, has acquired large tract at Spring Hill, near Shreveport, La., for new kraft pulp and paper mill, for which plans will be prepared at once. Plant will include a power house to be operated with natural gas as fuel; pumping station, machine shop and other mechanical departments. Storage and distributing buildings will be erected. Cost about \$6,000,000 with machinery. A mill village will be built near plant. J. H. Friend is vice-president.

**Pope-Stewart Corp.**, 448 Lexington Avenue, New York, manufacturer of motor trailers and parts, has leased one-story building at 35-28 Forty-second Street, Long Island City, for new plant; a welding division will be installed.

**Federated Metals Corp.**, 120 Broadway, New York, a subsidiary of American Smelting & Refining Co., same address, will take bids on general contract for new smelting and refining plant on seven-acre tract at Whiting, Ind., recently purchased, with power house, machine shop and other mechanical departments. Cost close to \$1,000,000 with equipment. Victor B. Seidel, Chicago office of company, 600 West Forty-first Street, is engineer.

**New York Central Railroad Co.**, 466 Lexington Avenue, New York, C. C. Warne, purchasing agent, asks bids until June 29 for steel wheels, axles, tubing, wire nails, conduit, roller bearings, track bonds, insulated magnet wire and other equipment (Serial Contract No. 6).

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until June 29 for soot blowers and spare parts for Brooklyn Navy Yard (Schedule 987).

**General Electric Co.**, Schenectady, N. Y., has let general contract to James E. Loew & Sons, Inc., 243 State Street, for one-story addition to building No. 32. Cost over \$50,000 with equipment.

**New York Armature Works, Inc.**, 729 Eleventh Avenue, New York, manufacturer of electrical equipment and operating an electrical repair works, has leased four-story building at 623 West Fifty-first Street for plant.

**Department of Water Supply, Gas and Electricity**, Municipal Building, New York, will take bids soon on general contract for one-story machine shop at Jerome Avenue and 209th Street. Cost over \$50,000 with equipment.

**Commanding Officer**, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until June 28 for one ball-bearing attrition mill, belt-driven (Circular 860), one mixing machine (Circular 861), one vacuum drying oven (Circular 862).

**Board of Education**, Summit, N. J., plans manual training department in new two-story and basement junior high school, for which bids will be received on general contract until July 9. Cost over \$350,000. Coffin & Coffin, 125 East Forty-sixth Street, New York, are architects.

**Department of City Transit**, City Hall Annex, Philadelphia, Gordon R. Exley, director, asks bids until June 29 for electric power substation No. 8, and for improvements in power substation No. 6 (Contract No. 233-A); for track installation, including contact rail, bonding track, etc., in Broad Street subway, South Street to Snyder Avenue (Contract No. 291).

**International Chain & Mfg. Co.**, Elm and

Norway Streets, York, Pa., has let general contract to C. A. Stambach & Sons, York, for one-story addition, 75 x 100 ft. Cost over \$50,000 with equipment.

**Commanding Officer**, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until June 28 for reworking 10,000 lb. anvil brass clippings into cartridge brass (Circular 819); until June 29 for one bench-type, motor-driven precision milling machine (Circular 837).

**State Prison Department**, Capitol Building, Harrisburg, Pa., plans erection of machine shops, power house, pumping station and other mechanical structures at new State prison at Mount Gretna, Pa., where about 18-acre tract has been selected. Entire project will cost close to \$2,000,000. Hornbostel, Clayton & Lapley, Harrisburg, are architects.

## ◀ BUFFALO DISTRICT ▶

**Frontier Fuel Oil Corp.**, Ellicott Square, Buffalo, has taken over a 75-acre tract on River Road for new oil refining plant, consisting of several one and multi-story units, with large steel tank storage and distributing division. Cost about \$175,000 with equipment. Work will be carried out under direction of Frontier Engineering Corp., first noted address, an affiliated organization. Mid-Continent Engineering Corp., Dallas, Tex., is consulting engineer.

**Loudon Packing Co.**, Terre Haute, Ind., canner and packer of food products, has let general contract to William A. Beccue, 178 Niagara Street, Lockport, N. Y., and to Peck & Lopus Co., Falconer, N. Y., for structural steel for new branch packing plant on seven-acre tract at Lockport. It will consist of main one and two-story building, 100 x 400 ft., and 50 x 90 ft., respectively, with boiler house and other mechanical units. Cost about \$135,000 with equipment. Company is affiliated with American Packing Corp., Evansville, Ind. Thomas C. Hayes is vice-president in charge.

## ◀ NEW ENGLAND ▶

**Connecticut Gas Products, Inc.**, New Haven, Conn., is negotiating for purchase of property at South Meriden, Conn., formerly held by Landers, Frary & Clark, as site for new one and multi-story plant for manufacture of gas equipment. Cost close to \$100,000 with machinery.

**Westinghouse Electric & Mfg. Co.**, Springfield, Mass., has asked bids on general contract for one-story foundry on Page Boulevard. Cost close to \$100,000 with equipment.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until June 29 for 15 stencil-cutting machines for Boston Navy Yard (Schedule 991); two vapor spray cleaners for Newport yard (Schedule 953).

**Cushman Chuck Co.**, Windsor Street, Hartford, Conn., has let general contract to Bartlett-Brainard Co., 16 Van Dyke Avenue, for one-story addition, 42 x 158 ft., and improvements in present plant. Cost close to \$50,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, are architects and engineers.

**Commanding Officer**, Ordnance Department, Watertown Ordnance Depot, Watertown, Mass., asks bids until June 28 for two power driving units (Circular 49).

## ◀ SOUTH ATLANTIC ▶

**Evans Metal Co.**, 1063 Virginia Avenue, Atlanta, Ga., has acquired about nine acres on Piedmont Road for new plant for manufacture of lead pipe and other lead, metal and metal-alloy products. It is scheduled for completion in fall. Cost close to \$100,000 with equipment.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until June 29 for one electric capstan, with motor, control and auxiliary equipment (Schedule 984); until July 2, 12, 16 and 36-in. gate valves (Schedule 1068) for Charleston, S. C., Navy Yard.

**United States Engineer Office**, Wilmington, N. C., asks bids until June 29 for one 20-in. dredge pump, with gaskets, bolts, nuts and spare parts (Circular 111).

## ◀ SOUTH CENTRAL ▶

**Continental Steel Corp.**, 445 Tennessee Street, Memphis, Tenn., manufacturer of steel wire products, fencing, nails and kindred specialties, with main plant at Kokomo, Ind., has leased one-story building, 90 x 315 ft., to be erected on Olive Street, Memphis, by McCallum & Robinson, 4019 Mallory Avenue, for new factory branch, storage and distributing plant. Cost over \$75,000 with equipment. Joseph T. Wallace, Commercial Title Building, Memphis, is architect.

**New Orleans Public Service, Inc.**, New Orleans, has taken out a permit for addition to steam-electric generating plant on Market Street, installation to include a 37,500-kw. turbo-generator unit and accessory equipment, high-pressure boilers and other equipment. Entire project will cost over \$2,000,000. Appropriation has been authorized.

**City Council**, Carrollton, Ky., has authorized plans for new municipal gas plant. Cost about \$50,000 with equipment.

**Eagle Cotton Oil Co.**, C Street, Meridian, Miss., has plans for one-story addition, primarily for storage and distribution. Cost close to \$40,000 with equipment.

**Waverly Sugar Co.**, Thibodaux, La., has plans for extensions and improvements in cane sugar mill, including additional equipment. Cost over \$85,000 with equipment. A. F. Delbert, 5335 Danneel Street, New Orleans, is engineer in charge.

**Town Council**, Lake Providence, La., asks bids until July 1 for diesel engine-generating unit and accessories, oil tank, pumping and auxiliary equipment, and crane for municipal electric power plant. W. M. Moore is town clerk.

## ◀ WASHINGTON DIST. ▶

**James Distillery, Inc.**, 807 Key Highway, Baltimore, plans three-story addition for rectifying and mechanical-bottling divisions. Cost close to \$75,000 with machinery.

**Chemical Warfare Service**, Edgewood Arsenal, Edgewood, Md., asks bids until June 30 for two 1000-lb. each electric-operated lifts, hinged type (Circular 196).

**General Purchasing Officer**, Panama Canal, Washington, asks bids until July 6 for one motor-driven metal-working lathe, galvanized chain shackles, galvanized wire rope clips, galvanized turnbuckles, 102,000 lin. ft. of copper wire cloth, 12,000 lin. ft. of steel wire cloth, 24,000 lin. ft. of galvanized steel wire poultry netting, one 1600-lb. scale, and other equipment (Schedule 3265).

**Board of Regents**, University of Maryland, College Park, Md., will take bids soon on general contract for new multi-story engineering building at institution. Cost about \$150,000 with equipment. Appropriation in amount noted has been arranged.

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids until July 14 for one crane-dredge and diesel engine-electric generating equipment installed on pontoon at Navy Yard, Pearl Harbor, T. H. (Specifications 8491).

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until June 29 for one motor-driven milling machine (Schedule 1060); until July 2, one motor-driven bench lathe, with bench (Schedule 1061), nickel-copper-alloy air cylinder forgings (Schedule 1062), bearing bronze liners, centrifugal cast (Schedule 1063) for Washington yard; until June 29, steam whistles, spare parts, special tools

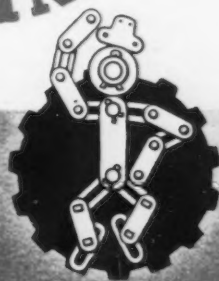




# JEFFREY CHAINS

IN THE STEEL MILL

**ON FEEDER AND CATCHER TABLES**



● High speeds . . . ravages of roll scale and water . . . shock from sudden reversals . . . Jeffrey accepts them as the service conditions which chains on feeder and catcher tables must endure . . . and builds those chains accordingly.

By combination of the most suitable materials and their treatment . . . with design knowledge gained by long experience . . . Jeffrey chains are given that added wear resistance and strength so necessary for continuous and gruelling service in the steel mill. Thousands of feet of these chains are taking the load on modern, high-speed tables.

In other service, too, you'll find Jeffrey chains dependable and long lasting. Put them to work on sheet transfer tables . . . pallet conveyors . . . slab transfer and crop conveyors . . . and other conveyor applications in your mill. They will minimize delays.

*Jeffrey*

**THE  
JEFFREY MANUFACTURING CO.**

925-99 North Fourth Street  
Columbus, Ohio





and wrenches (Schedule 959), fuel oil service pumps and spare parts (Schedule 998); until July 2, fin-type steam radiators (Schedule 9028), cast steel rollers, with mild steel spindles (Schedule 982), emergency feed pumps, fire and bilge pumps (Schedule 992); until July 6, one oil-fired crucible metal-melting furnace (Schedule 1065) for Eastern and Western yards.

## ◀ SOUTHWEST ▶

**Benjamin Moore & Co.**, 1630 South Second Street, St. Louis, manufacturers of paints, varnishes, oils, etc., have let general contract to Gamble Construction Co., 620 Chestnut Street, for one and two-story addition, 61 x 70 ft. Cost over \$40,000 with equipment. Mauran, Russell & Crowell, Chemical Building, are architects.

**Phillips Petroleum Co.**, Bartlesville, Okla., has acquired about 90 acres near Goldsmith, Tex., for new natural gasoline plant, with compressor station, power house, machine shop, pumping plant, steel tank storage and distributing facilities, and other departments. Cost over \$1,000,000 with machinery.

**Kansas Service Grocers, Inc.**, 1520 Central Avenue, Kansas City, Kan., Samuel Manne, head, has leased one-story building, 100 x 260 ft., to be erected by Kansas City Industrial Land Co., in Fairfax Industrial District, for new bulk storage and distributing plant. Cost close to \$100,000 with loaders, conveyers and other mechanical-handling equipment. Charles E. Keyser, 609 Minnesota Avenue, Kansas City, Kan., is architect.

**Refugio Refining Co.**, Refugio, Tex., has acquired tract near Edinburg, Tex., for new oil-skimming and treating plant, with steel tank storage and distributing department. Cost over \$100,000 with equipment.

**Andrew Koriath**, 301 South Montgomery Street, Sherman, Tex., has plans for new one-story machine shop on adjoining site. Cost close to \$30,000 with equipment.

**American Machine & Iron Works**, Odessa, Tex., has acquired site for new plant, comprising main one-story unit, 90 x 150 ft., for general iron-working and machine shop, and one-story structure adjoining for storage and distribution. Cost close to \$50,000 with equipment.

## ◀ WESTERN PA. DIST. ▶

**Carolina Aluminum Co.**, Gulf Building, Pittsburgh, a subsidiary of Aluminum Co. of America, Inc., has plans for new hydroelectric power plant on Yadkin River, near Tuckertown, N. C., for service at mining properties and mill at Badin, N. C. Project will include dam, 1300 ft. long and 90 ft. high, with generating station of 54,000-hp. initial capacity. Transmission line will be built to mill site. Cost over \$750,000.

**Robertshaw Thermostat Co.**, Youngwood, Pa., manufacturer of automatic temperature control equipment, parts, etc., has plans for one and two-story addition. Cost over \$50,000 with equipment. Company is a subsidiary of Reynolds Metals Co., Inc., 19 Rector Street, New York.

## ◀ OHIO AND INDIANA ▶

**Columbus Casting Co.**, Olentangy River Road, Columbus, Ohio, manufacturer of iron castings, has plans for one-story L-shaped foundry, 72 x 125 ft. Cost about \$50,000 with equipment. Superstructure will begin this month.

**Firestone Steel Products Co.**, Akron, Ohio, manufacturer of steel automobile rims, metal stampings, etc., a subsidiary of Firestone Tire & Rubber Co., has plans for new works at Riverview, near Detroit, where large tract recently was acquired by parent company. It will be one-story, for production of rims and air springs, including parts and assembling. Cost over \$600,000 with equipment.

**Lincoln Electric Co.**, 12818 Coit Road, N.E., Cleveland, has let general contract to Austin Co. for one-story addition, 300 x 300 ft. Cost about \$350,000 with equipment.

**American Lacquer Co.**, 1127 West Sixth Street, Cincinnati, manufacturer of lacquers, varnish, oils, etc., will ask bids soon on general contract for three one-story additions, 50 x 100 ft., 25 x 80 ft., and 15 x 30 ft. Cost over \$70,000 with equipment. Morris Wasserman, Doctors' Building, is architect.

**Taylor-Young Airplane Co.**, Alliance, Ohio, has taken bids on general contract for one-story addition. Cost close to \$50,000 with equipment. William C. Young is executive vice-president.

**Contracting Officer**, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until July 1 for 500 generator terminal housing assemblies (Circular 835).

**Delco-Remy Corp.**, Anderson, Ind., manufacturer of automobile starting and lighting equipment, has let general contract to Albert J. Glaser, 401 South Lincoln Avenue, Muncie, Ind., for one-story plant unit, 240 x 520 ft., for production of starting motors, parts manufacture and assembling, and adjoining structure, 50 x 190 ft., for office and other operating service. Cost over \$500,000 with equipment. F. C. Kreger is manager at local plant.

**Austin Packing Co.**, Franklin, Ind., food products, has plans for one-story addition, 100 x 200 ft., primarily for storage and distribution. Cost over \$60,000 with equipment.

## ◀ MICHIGAN DISTRICT ▶

**Hardie Mfg. Co.**, Hudson, Mich., manufacturer of spraying machinery and parts, has let general contract to Austin Co., for one-story machine shop. Cost close to \$50,000 with equipment.

**American Seating Co.**, Grand Rapids, Mich., manufacturer of iron frame seating equipment for schools, theaters, etc., has let general contract to Owen-Ames-Kimball Co., Grand Rapids, for one-story addition. Cost about \$40,000 with equipment.

**Jackson Brewing Corp.**, National Bank Building, Detroit, has arranged for sale of about 250,000 shares of stock, to net close to \$250,000, part of proceeds to be used for plant construction and equipment.

**North American Pulp & Paper Corp.**, Cheboygan, Mich., has let general contract to Williams Construction Co., Niles, Mich., for one-story addition, 135 x 208 ft., primarily for storage and distribution. Cost over \$70,000 with equipment.

**General Body Corp.**, 11830 Charlevoix Avenue, Detroit, recently organized with capital of \$225,000 to manufacture all-welded steel passenger trailers and kindred automobile equipment, is modernizing former plant of Welded Steel Barrel Co., address noted, totaling about 70,000 sq. ft. of floor space. Three sizes of trailers will be manufactured, and production will be placed under way soon. H. Jay Hayes, formerly head of Hayes Body Corp., is president; Hugh Chalmers, Jr., president of Pontiac Spring Co., Pontiac, Mich., is interested in new company.

## ◀ MIDDLE WEST ▶

**Globe Roofing Products Co.**, 176 West Adams Street, Chicago, has acquired tract at Whiting, Ind., for new plant, to comprise initial group of six one-story units, with main building, 40 x 306 ft., and adjoining structures, 45 x 95 ft., 40 x 100 ft., 32 x 65 ft., and smaller. A steam power house will be built; also stills, tanks and other mechanical facilities. Cost over \$100,000 with equipment.

**Adams Machinery Co.**, 134 South Clinton Street, Chicago, manufacturer of machinery and parts, has purchased machine shop building of Hansell-Elecock Co., Twenty-fourth and Canal Streets, for expansion.

**Florence Stove Co.**, Kankakee, Ill., has let general contract to L. Balkin Builder, Inc., 2020 North Austin Street, Chicago, for one-story addition. Cost over \$50,000 with equipment. Frank D. Chase, Inc., 307 North Michigan Avenue, Chicago, is architect and engineer.

**City Council**, Flandreau, S. D., will take bids before close of month for engine-generator unit, boilers, pumping machinery and auxiliaries for new municipal electric power plant. Bond issue of \$169,000 has been approved and \$70,000 secured through Federal grant. Buell & Winter Engineering Co., Insurance Exchange Building, Sioux City, Iowa, is consulting engineer.

**Electric Welding & Machine Works**, Cities Service Building, Thief River Falls, Minn., has plans for new one-story welding and repair shop, 50 x 100 ft. Cost about \$25,000 with equipment.

**Pittsburgh Plate Glass Co.**, 235 East Pittsburgh Avenue, Milwaukee, is considering bids opened June 14 for erection of new resin factory, 73 x 107 ft., two stories and basement. Cost \$65,000 with equipment. E. D. Griffin is general manager at Milwaukee.

**Perfex Radiator Co.**, 415 West Oklahoma Avenue, Milwaukee, manufacturer of automobile and motor truck cooling systems, space heaters, etc., has placed general contract with Permanent Construction Co., 2712 North Holton Street, for factory addition, 40 x 140 ft., according to plans by Architect Herbert W. Tullgren, 1234 North Prospect Avenue.

**Rundle Mfg. Co.**, 3305 West Forest Home Avenue, manufacturer of enameled sanitary ware, has placed general contract with Klug & Smith Co., 111 East Wisconsin Avenue, local, for shop extension costing about \$25,000.

**Wisconsin Power Co-Operative**, Chippewa Falls, Wis., has engaged E. B. Wayts, chief engineer, Wisconsin Rural Electric Administration, Madison, Wis., to handle proposed project for seven counties costing from \$800,000 to \$1,000,000 including steam generating plant, transmission lines, etc.

## ◀ PACIFIC COAST ▶

**General Controls, Ltd.**, 624 East Fourth Street, Los Angeles, manufacturer of temperature control equipment, pressure regulators and allied apparatus, has asked bids on general contract for one-story plant at Glendale, Cal., where tract recently was acquired. Initial unit will total about 35,000 sq. ft. floor space. Cost close to \$60,000 with equipment. W. R. Ray, care of Luffing Machine Co., 1637 Compton Avenue, Los Angeles, is engineer.

**Los Alamitos Sugar Co.**, Montana Ranch, Long Beach, Cal., is considering erection of new beet sugar mill in Imperial Valley district, where site is being selected. It will include power house, pumping station, machine shop and other mechanical departments. Cost close to \$1,000,000 with equipment.

**Washington Stove Works**, Forty-third and Smith Streets, Everett, Wash., manufacturer of stoves and ranges, parts, etc., has plans for one-story foundry, 60 x 104 ft. Cost close to \$30,000 with equipment.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until June 29 for power units, rotating mechanisms, topping winches and spare parts (Schedule 964) for Mare Island and Puget Sound Navy yards; until July 2, four turbine-driven fuel oil service pumps and spare parts (Schedule 975), one motor-driven engraving machine (Schedule 981) for Puget Sound yard.

**Coca-Cola Co.**, Stockton, Cal., has plans for new two-story mechanical-bottling plant. Cost about \$80,000 with equipment.

**Water Department**, Tacoma, Wash., will take bids soon for one-story mechanical shop, equipment storage and distributing plant. Cost about \$125,000 with equipment. W. A. Kunigk is city water superintendent in charge.

**Office of Constructing Quartermaster**, Sacramento Air Depot, Sacramento, Cal., asks bids until July 13 for equipment repair building, air corps operations building and air corps engineering building (Proposal 6870-27).

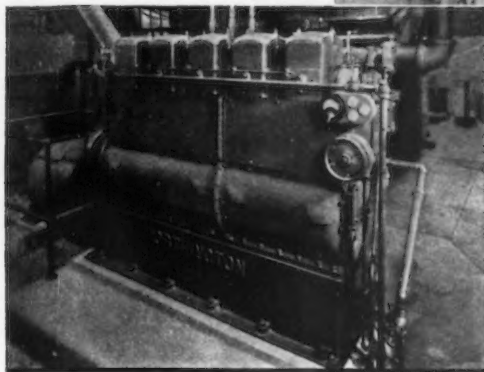
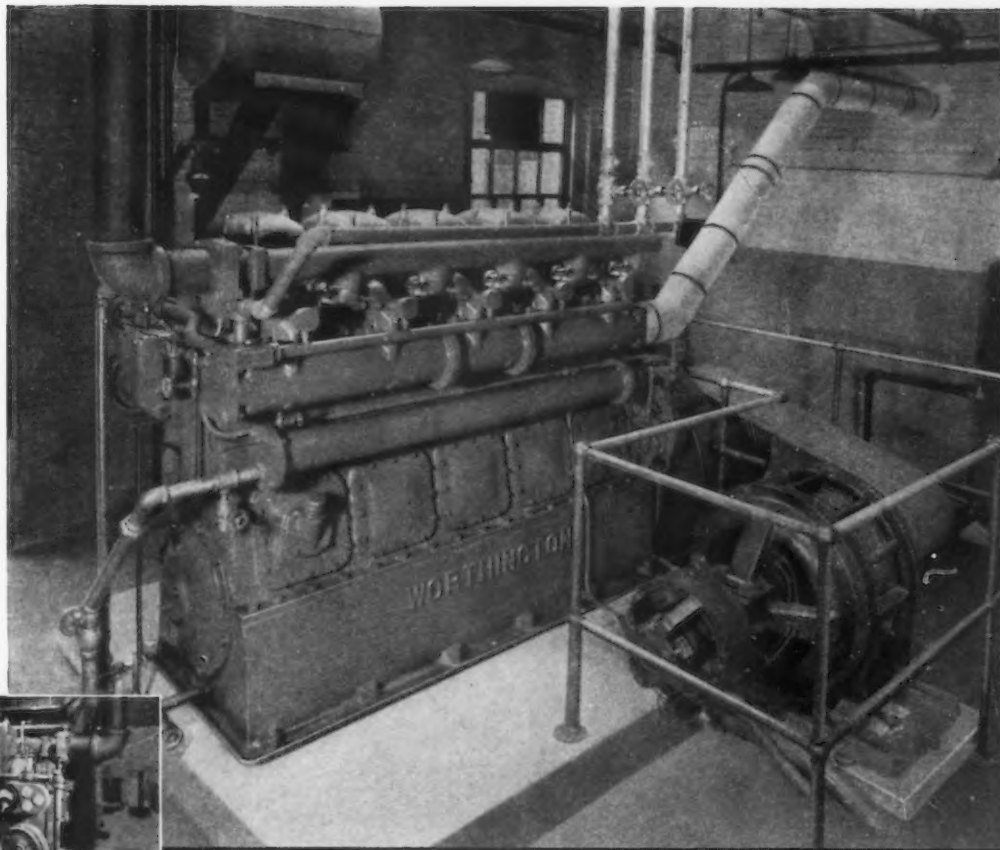
## ◀ FOREIGN ▶

**British Can Co., Ltd.**, Stokes Street, Manchester, England, has plans for one-story addition for large increase in present capacity and will begin superstructure soon. Cost close to \$500,000 with equipment.

**Ministry of Communications**, Tokyo, Japan, has plans for new Federal-owned hydroelectric generating plant on Ibi River, Gifu Prefecture, where site has been acquired. Cost over \$2,500,000 including transmission lines, power substations and switching stations. Work is scheduled to begin this summer.

**Canada Packers, Ltd.**, Vancouver, B. C., food canner and packer, has plans for new works on Terminal Avenue, comprising several units with power house. Cost about \$600,000 with equipment. W. G. Eversfield is local manager.

At Positive Lock Washer Company's Newark, New Jersey, plant, this modern Diesel power installation is completely Worthington. The 150-hp. Worthington Diesel is driving the generator through a Worthington Multi-V-Belt Drive. All auxiliary equipment is by Worthington.



## Another Worthington Diesel is contributing substantially to profitable plant operation

...adding to a long list of installations in which Worthington engine economy is being consistently demonstrated.

**I**N some plants, power costs have been cut to less than half of former costs... thus directly augmenting profits.

A Worthington engineer will be glad to study your power problem, and submit complete recommendations to meet your exact requirements.

Worthington engines are built for continuous operation at medium speeds. A complete line provides the correct unit for every individual condition... and Worthington air compressors for starting, rotary pumps for fuel transfer, and centrifugal pumps for jacket cooling, give additional service security through the undivided responsibility of one maker.

### OTHER WORTHINGTON PRODUCTS:

AIR CONDITIONING EQUIPMENT  
REFRIGERATION AND  
ICE PLANT EQUIPMENT  
AIR AND GAS COMPRESSORS  
STEAM TURBINES  
STEAM CONDENSERS  
STEAM-JET EJECTORS  
FEEDWATER HEATERS  
PUMPING EQUIPMENT  
V-BELT DRIVES  
LIQUID METERS  
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Literature on request

**DIESEL ENGINES**  
50 to 1500 hp.

Every type  
of drive

**GAS ENGINES**  
30 to 1800 hp.

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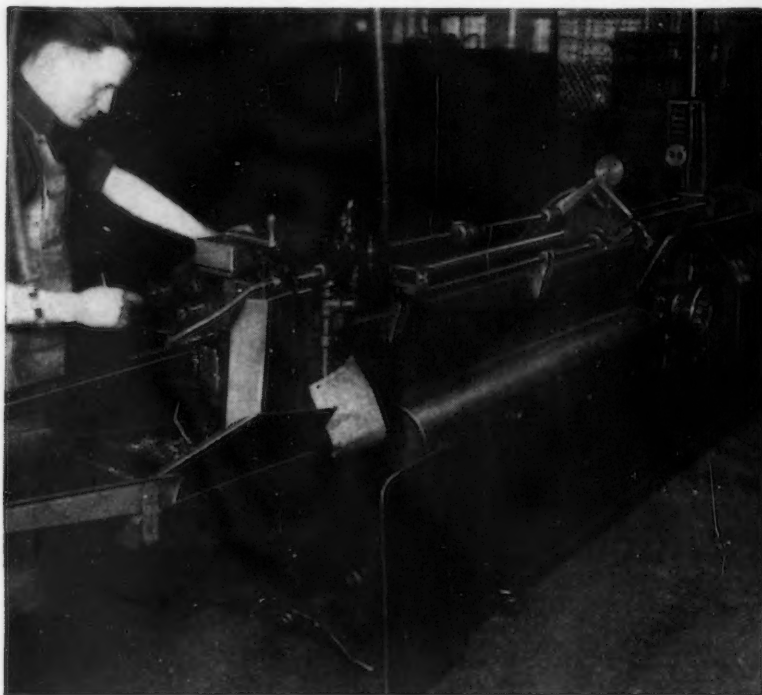
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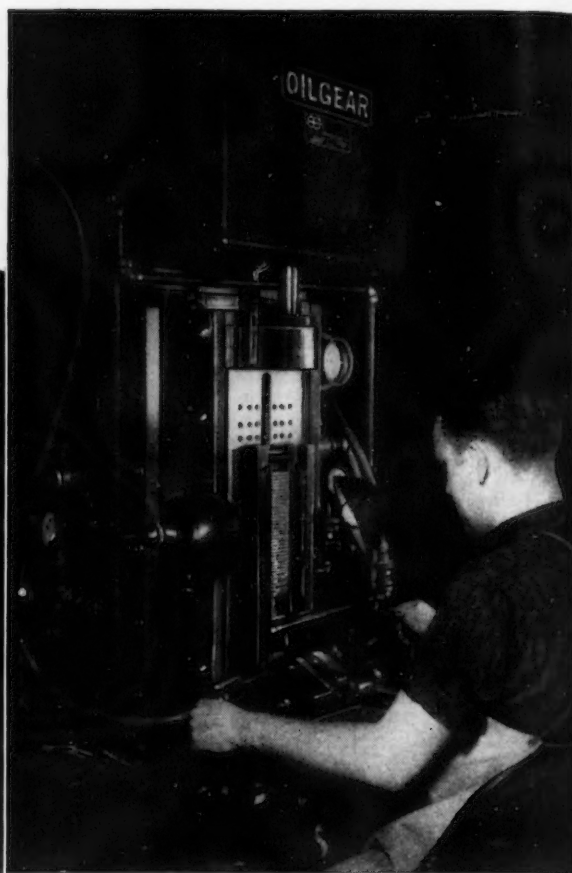
**I.B.M. Uses Oilgear  
Horizontal Broaching Machines**

*Below:* 285 units per hour. Pull of 8.7 feet per minute. Mills rack-stop plungers .796" long, .1235" wide and .108" thick, from .3115" cold rolled steel. Tolerances of plus 0, minus .0015 in depth.



**I.B.M. Uses Oilgear  
Vertical Broaching Machines**

*Right:* Broach shown produces 170 pieces per minute, broaching teeth, length and notch in type bar racks. Cutting speed, 19 F.P.M., tolerances .002"; operates only when both hands are kept on safety devices.



## Great Machine Builders are "Keen" Machine Buyers

Builders of fine machinery are naturally able and discriminating buyers of machinery. And when great precision-machine builders choose Oilgear Broaching Machines time after time, there is an inescapable implication for anyone who thinks the matter through. Here are shown two of the Oilgear

Broaching Machines used by I.B.M. When your plant needs broaching machines, presses or precise-control, dependable variable speed transmissions, consult Oilgear engineers. Your inquiries will be given fullest attention. THE OILGEAR COMPANY, 1303 W. Bruce St., Milwaukee, Wisconsin.

**OILGEAR** *Fluid Power*  
BROACHING MACHINES—PRESSES  
FEEDS—VARIABLE SPEED TRANSMISSIONS



# New Industrial Literature

A REVIEW OF CURRENT CATALOGS AND CIRCULARS . A TIME SAVING SERVICE FOR BUYERS

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Address The Iron Age, 239 West 39th St., New York City*

**PUMPS.**—Goulds Pumps, Inc. A comprehensive 80-page catalog describing centrifugal, rotary, and reciprocating pumps and accessories. Catalog is profusely illustrated with cut-away drawings and photos of various pumps. Also contains data relative to installation, suction requirement curves for hot water, and complete ratings for all pumps. A section is devoted to foot valves, priming chambers, and companion flanges. Will be of interest to plants with varied pumping requirements. Bulletin 6-150.

**CUTTING TOOLS.**—Victor Machinery Exchange, Inc. A general catalog covering high speed and carbon cutting tools, taps, and other machine shop supplies. Bulletin 6-151.

**LUBRICATION IN GRINDING OPERATIONS.**—Standard Oil Co. (Indiana). Outline of external, internal and centerless grinding and their lubrication problems. Bulletin 6-152.

**SOAKING PIT CONTROLLERS.**—Automatic Temperature Control Co. Folder discusses the use of its timers for controlling the reversal of firing periods in soaking pits, open hearths and glass melting furnaces. Photographs show application. Bulletin 6-153.

**MOTOR PUMPS.**—Ingersoll-Rand Co. A catalog describing its "Cameron Motor-pumps". Capacities range from 5 to 1000 gal. per min., for heads to 500 ft. Bulletin 6-154.

**INDUSTRIAL ELECTRIC TRUCK CONTROL.**—Automatic Transportation Co. A looseleaf folder describing "Rotor-Brush" controls for industrial electric trucks. Amply illustrated. Bulletin 6-155.

**SANDBLAST HELMETS.**—W. W. Sly Mfg. Co. Folder describes their seamless rubber helmet, also blower units for use where compressed air is not available. Bulletin 6-156.

**DUST CONTROL.**—W. W. Sly Mfg. Co. A fifteen-page bulletin describing various types and installations of dust filters. Drawings show method of adapting fil-

ters to various building conditions. Bulletin 6-157.

**MERCURY VAPOR LIGHTING.**—Westinghouse Electric & Mfg. Co. A 32-page loose-leaf catalog for insertion in their large catalog. The catalog describes mercury vapor lamps, reflectors, transformers and reactors. A section is devoted to designing mercury vapor installations. Bulletin 6-158.

**MAGNETIC VIBRATING SCREENS.**—Allis-Chalmers Mfg. Co. Folder describes "Utah" electro-magnetic vibrating screens which are adapted to screening medium and finer sizes of materials, either wet or dry. Screens are available for 25, 50 or 60 cycle, 440 volt current. Bulletin 6-159.

**DIESEL ENGINES.**—G.D.S. Shearing & Punching Machine Co. Folder illustrates their small single and double cylinder diesel engines, available in capacities of 8 to 32 hp. Bulletin 6-160.

**AIR CONDITIONING.**—Westinghouse Electric & Mfg. Co. Additional data sheets for use with their Air Conditioning Engineering Data Book. Contains information on performance of the air-cooled "Mobilair," and dimensions and specifications of the 15 hp. condensing unit. Bulletin 6-161.

**STAINLESS STEEL.**—United States Steel Corp. 15-page booklet discusses stainless steel in architecture. Photos show a number of interior and exterior applications. Tables give physical properties and fabrication directions. Bulletin 6-162.

**CENTRIFUGAL PUMPS.**—Fairbanks-Morse & Co. Folder illustrating ball-bearing, high speed pumps for operating against heads up to 245 ft. Includes operating data and dimensions. Bulletin 6-163.

**DIGGING BUCKETS.**—Wellman Engineering Co. Folder describes their "Champion" crane digging buckets. Illustrates various features of construction. Also describes trailers. Bulletin 6-164.

**MATERIAL HANDLING.**—Baldwin-Duckworth Chain Corp. An unusual presentation of a material handling problem and its solution, in the form of a "Crime Dossier". Bulletin 6-165.

**OPEN STEEL FLOORING.**—Dravo Corp., Machinery Division. Catalog describing "Tri-Lok" open steel flooring, armoring and safety steps. Also illustrates typical applications. Bulletin 6-166.

**AUTOMATIC TIMERS.**—Automatic Temperature Control Co. Folder showing various types of automatic controllers developed for special applications. Bulletin 6-167.

**MACHINE FASTENERS.**—Russell, Bird-sall & Ward Bolt and Nut Co. Handbook consisting of 26 illustrations of the accepted method of drawing various types of bolts, nuts and rivets. Designed for use by draftsmen and engineers. Bulletin 6-168.

**GRINDING AND POLISHING MACHINE.**—Production Machinery Co. Folder describes grinding, polishing and surfacing machine. The machine combines disc grinding and belt polishing. Another folder illustrates a direct motor connected, abrasive belt polishing machine. Bulletin 6-169.

**AUTOMATIC LATHES.**—Cone Automatic Machine Co., Inc. Three 16-page bulletins devoted to the four-spindle Cone automatic, the four-spindle Conomatic, and the eight-spindle Conomatic, respectively. Construction features and attachments are described and illustrated, and dimensional data, specifications and capacities are given. Bulletin 6-170.

**WELDING GUNS.**—Progressive Welder Co. Eight-page brochure describing constructional features of the Progressive hydraulic welding gun, with numerous illustrations showing the application of the equipment in the automotive industry. A large number of small line drawings illustrate the numerous types of welding gun heads available from stock. Bulletin 6-171.

*If you want your new catalog or literature listed here  
send a copy to above address*

# Overlapping Circulation

Any publication soliciting subscriptions from (or sending free copies to) METAL-WORKING FIRMS, must greatly duplicate the well established Iron Age Circulation.

For years, metal-working firms have bought The Iron Age--89% of such sales are voluntary mail orders--82% renew their subscriptions.

Thus over a long period, The Iron Age has gradually perfected a fully paid subscription list that is the roll call of worth while metal-working factories.

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WHAT ARMOR WAS TO THE MERRIMAC



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## IS TO IRON AND STEEL

In the battle against rust, the hot galvanized product always wins because the hand dipping process gives you a natural coating of approximately two and one-half ounces of zinc per square foot of surface . . . Exhaustive tests prove that this is the thickness that gives greatest protection per dollar . . . When you buy from our members you can be certain that association standards for workmanship and thickness of coating have been strictly maintained . . . This assures you of maximum protection at minimum cost . . . Write for our new booklet. Address American Hot Dip Galvanizers Association, Inc., American Bank Building, Pittsburgh, Penna.

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# ZINC ALLOY DIE CASTINGS

—their place in the Major Industries



## DETAIL!

### —The basic factor in toy realism

CLEAN cut detail is an important quality in many products of industry—in certain fields, such as metal toys, it is an absolute essential. The remarkable detail of a ZINC Alloy Die Cast gun body has given this toy picture gun the realistic appeal that makes it a 1937 "best seller."

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Your problems may not include the reproduction of detail, but there are other specific advantages of ZINC Alloy Die Castings—dimensional accuracy, savings in machining and assembling, weight reduction, rigidity—that are solving production problems in many fields. If you are not thoroughly acquainted with ZINC Alloy Die Castings and their potentialities, we suggest you consult a commercial die caster—or write to this Company.

THE NEW JERSEY ZINC CO.  
160 Front Street New York

The Research was done, the Alloys were developed, and most Die Castings are specified with  
**HORSE HEAD SPECIAL** (<sup>99.99+%</sup> UNIFORM QUALITY) **ZINC**

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12 PERFECT FILES IN EVERY DOZEN...

## THIS COMPANY'S OUTSTANDING CONTRIBUTION TO MODERN FILE MAKING



Since it was established in 1863, the Nicholson File Company has been responsible for many important advances in file making.

An outstanding contribution is our ability to produce thousands of dozens of files, alike in every detail and in ability to give uniformly efficient performance.

Repeated tests with other brands show the performance of our files right up against the line of absolute uniformity. Variations from the remarkable standard maintained by Nicholson File Company experts mean wasted energy and money in industrial plants.

Nicholson, Black Diamond and McCaffrey Files come "Twelve Perfect Files in Every Dozen." Mill supply dealers can meet your needs. Nicholson File Company, Providence, R. I., U. S. A.

... A FILE FOR EVERY PURPOSE

MADE IN THESE BRANDS  
NICHOLSON   
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McCAFFREY 

PATENTS  
PENDING

Products of Specialists Have

Always Been Preferred . . . . .



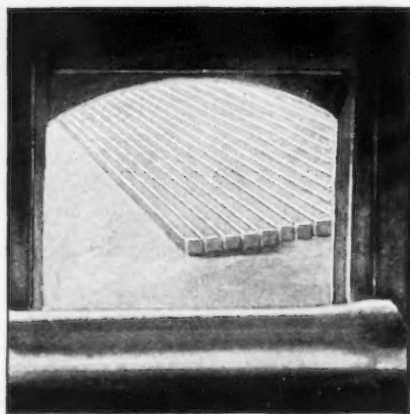
## They Wanted Their Clocks to Keep Time

● Clock merchants in England, at one time, insisted that springs for their clocks be made from a particular Hindu-produced steel. The substitution of inferior springs made of domestic steel resulted in unreliability and lack of uniformity in their timepieces. By insisting on products made by specialists, from materials best suited for the need, they insured the satisfaction of their customers. Their own reputations were protected; and the continued demand for their products was assured.

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*Steel billets ready to be hot rolled into Superstrip at the Acme mill.*

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STRIPED



GALVANIZED • STAINLESS  
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**RIGHT ON THE NOSE**  
*to save 40%*



## GISHOLT TURRET LATHES

Sizes range from 1" to 12" bar capacity—up to 34" chucking capacity

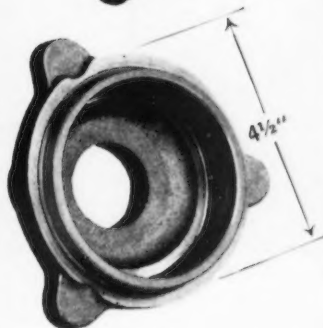
● Here's the way you can expect costs to drop when you turn to new Gisholt equipment. This large manufacturer replaced an obsolete machine with this new Gisholt No. 5 Ram Type Universal Turret Lathe, and the cost for these 8,000 housings was

cut from \$600 to \$360; in this case, exactly 40%. Multiple cutting reduced three operations to one—gave desired accuracy within .001"; cut time more than 1/3. Savings like this are mighty important in reducing your manufacturing costs.

*These features, combined only in Gisholt Ram Type Universal Turret Lathes, are responsible for this saving:*

- ★ Heavy, rigid construction built to withstand multiple cutting and high cutting speeds.
- ★ 12 speed headstock and 8 power feeds in both carriages give a selection of cutting speeds and feeds best suited to the job.
- ★ Automatic spindle brake saves time in shifting to different speeds; also in quicker positioning of spindle when chucking the piece in the fixture.
- ★ The use of multiple turning heads with overhead pilots. In another operation, two grooves are formed at once from the hexagon turret with a double cutter in a slide tool.
- ★ Automatic indexing and clamping of the hexagon turret and quick indexing and clamping of the square turret tool post, speeds up the cycle of operations.
- ★ Selective gear transmission saves time in permitting direct shifting from a high to a low speed or vice versa.
- ★ Easier, faster operation with simple controls and less effort.

Why not get full information on these new Gisholts? It's time now to tool up for lower manufacturing cost. Write for catalog describing Gisholt Ram Type Universal Turret Lathes.



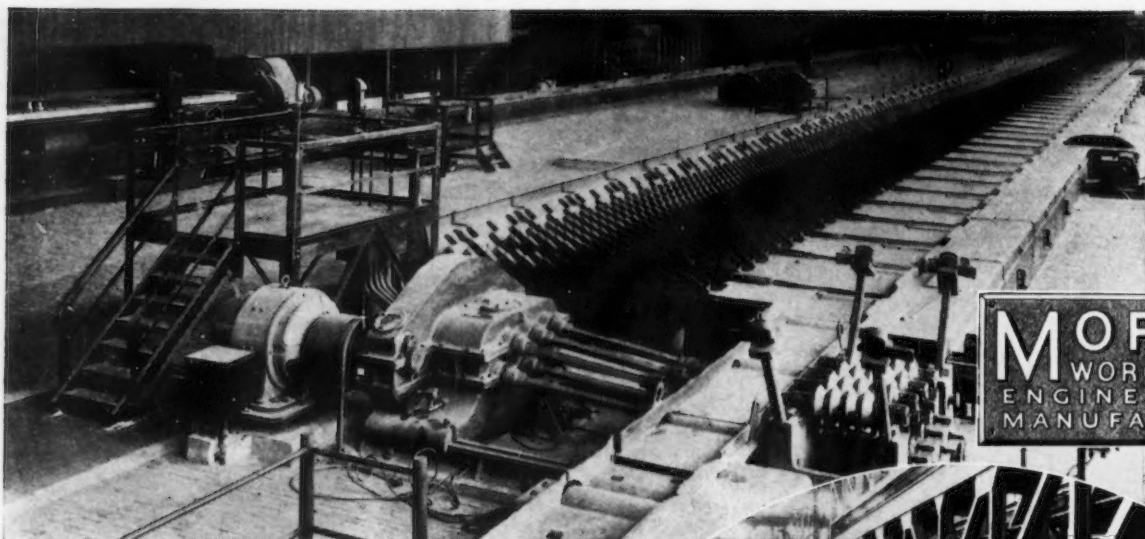
*These housings for a cylinder shaft bearing formerly cost 7 1/2¢ each to machine. With new Gisholt equipment and new tooling, machining costs have been cut to 4 1/2¢ each.*

Keep up with the new improvements that shorten set-up and machining time. Write for copy of the new Gisholt catalog of standard tools for Nos. 3, 4 and 5 Ram Type Universal Turret Lathes.



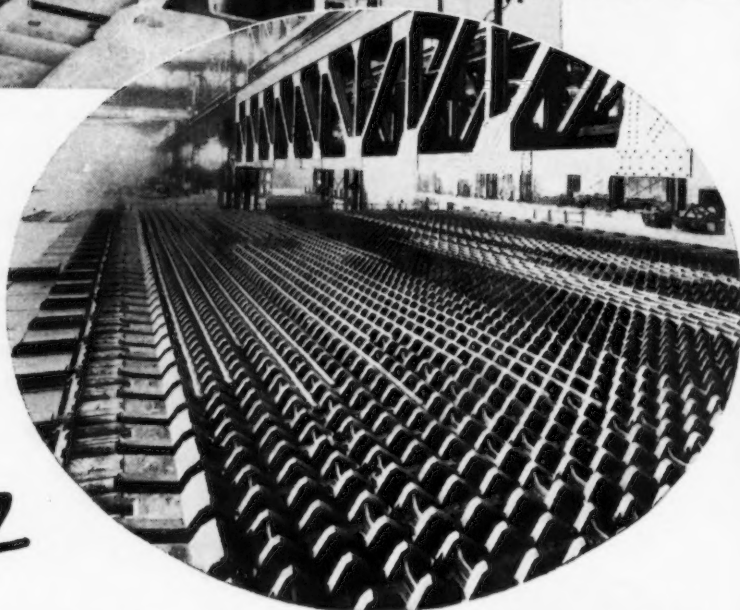
## GISHOLT MACHINE COMPANY

1215 EAST WASHINGTON AVENUE, MADISON, WISCONSIN, U. S. A.  
TURRET LATHES • AUTOMATIC LATHES • TOOL GRINDERS • BALANCING MACHINES



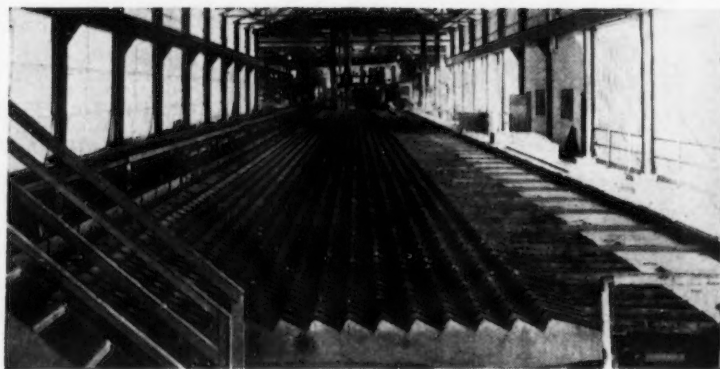
**MORGAN**  
WORCESTER  
ENGINEERS AND  
MANUFACTURERS

# CARRY-OVER BEDS *by* *Morgan*



## Safeguard Time, Material and Profits

Morgan Carry-over Beds are the modern rolling mill's assurance of efficient and economical handling of material immediately after it issues from the last stand. Bars and merchant shapes are moved smoothly and rapidly across the face of the bed, each length being transferred in a straight line. The accurately machined notches are designed to avoid marring the surface of stock, and permit subsequent expansion in individual lengths without buckling.



Efficient carry-over beds of all types exemplify Morgan progressiveness, its constant study of detail, and its efforts to improve rolling mill processes, products and profits.

R25

**MORGAN CONSTRUCTION COMPANY • WORCESTER, MASS., U.S.A.**



# BY THE KAUFMAN PROCESS

• Cap screws made by the Kaufman Process, *patented*, have much greater thread accuracy and strength, and a finer finish. Our own plant development, the Kaufman Process means a better cap screw at the cost of commercial cap screws—resulting in faster and more secure assemblies, at lower production costs.

THE CLEVELAND CAP SCREW COMPANY, 2930 E. 79th St., Cleveland, Ohio.



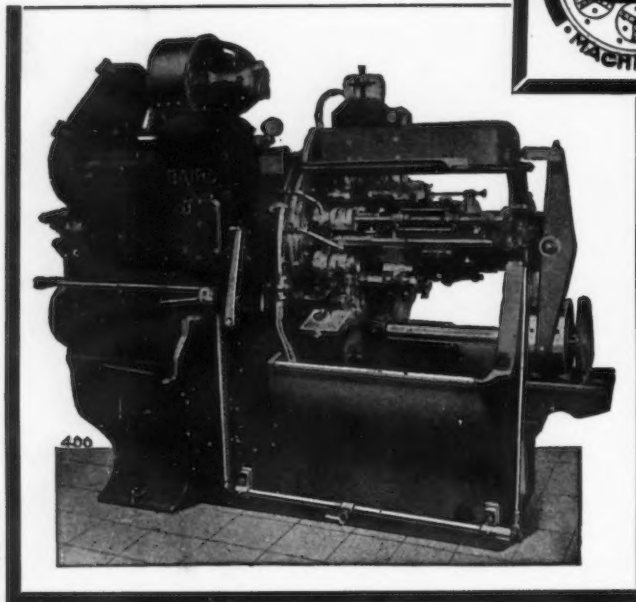
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SET SCREWS • BOLTS AND NUTS

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In building this Baird 7" Horizontal Automatic Chucking Machine our aim was to produce a machine that would turn out accurate work at a fast rate, and that would stay accurate after a long period of service. Customers tell us our aim too was accurate, as the machines achieved these results.

In addition to high spindle speeds the time for indexing including "air cuts" of the tools is only 2.15 seconds for single indexing. Accuracy of parts machined meets the inspection departments' O.K.

Baird Chucking Machines perform all the usual lathe operations and also drilling, milling slots or oil grooves, inserting bushings, etc. Flexibility in tool setups and in operation makes this machine a decided asset to your machine shop. For quotations or estimates—

*"Ask Baird About It"*

**THE BAIRD MACHINE COMPANY**  
BRIDGEPORT, CONN.

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*Serving Industry Since 1896*



**A**LL our efforts have been concentrated on one product — STAMPINGS—for 40 years. We have made stampings, deep, intricate, heavy, light, large and small, for nearly every branch of industry.



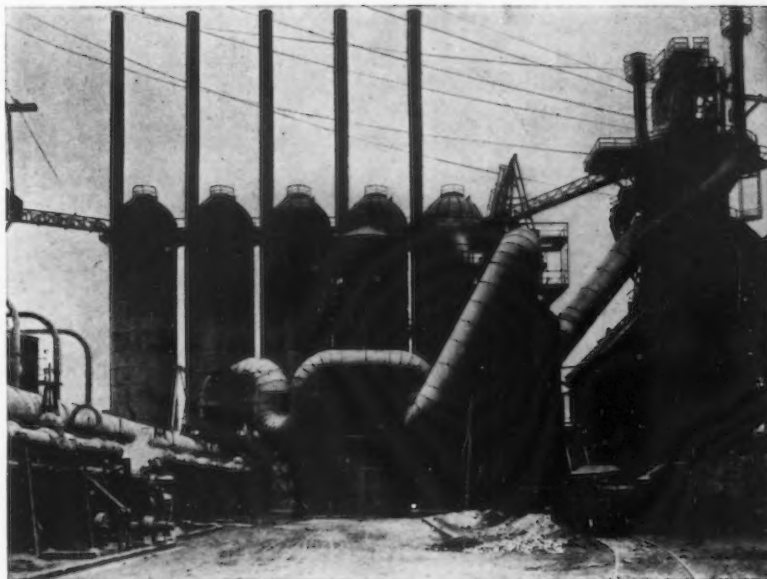
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**A SUPERIOR  
REFRACTORY  
LAGGING  
for  
TEMPERATURES  
UP TO 2200° F.**



# INSULAG

(REG. U. S. PAT. OFF.)

## ***Stops Heat Losses***

On Hot Blast Mains, Bustle Pipes, Hot Blast Stoves, Open Hearth Furnace Walls, and Other Equipment Requiring UNUSUAL INSULATION

Extraordinary high refractory and insulating properties. Used where other lagging materials fail. Easily applied on hot or cold surfaces. Expands after application and retains increased volume. Develops high mechanical strength upon drying. Durable; water resistant; light weight; withstands shock, abrasion and vibration.

**LOW THERMAL CONDUCTIVITY**—INSULAG retains practically constant insulating values throughout its service range, so that under varying conditions and temperature changes there is no appreciable loss of insulating efficiency. ONE INCH of INSULAG has an insulating value equal to about NINE INCHES of fire brick and has about 1/60 the heat storage capacity of fire brick walls of equal heat flow. Therefore, relatively thin applications of INSULAG may be substituted for heavy masses of refractories.

*New Bulletin IA327 has full details. Send for it today.*

## **QUIGLEY COMPANY, INC.**

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*Makers of HYTEMPITE, "The World's Standard High Temperature Cement"*

Distributors with Stocks and Service in Important Industrial Centers throughout the United States, Canada, and in 32 other countries.  
In Canada, Quigley Company of Canada, Limited, Lachine, P. Q.

### Machine Screws

### Special Studs

### Special Screws

### Machine Screw Nuts

If you want real service, let us know your needs. Progressive Manufactured Products are made on both a quality and price basis. Their uniformity is your guarantee of speedier assembly.

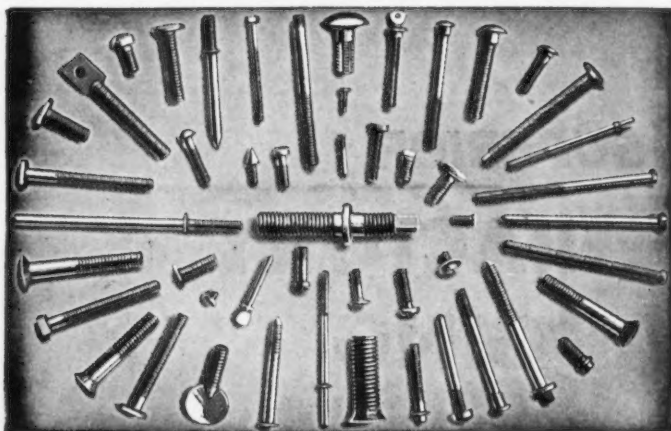
Do you know about the savings made possible by our special heading process? Better get in touch with us.

### The PROGRESSIVE MFG. CO.

TORRINGTON, CONN., U. S. A.

IN STOCK AT ALL TIMES—

Standard Machine Screws; Machine Screw Nuts; Interchangeable Bolts and Nuts made strictly to A.S.M.E. tolerances



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MULTIPLE SPINDLE

### CHUCKING MACHINES

Two, Four, Five Spindles • Work and Tool Rotating Types  
GOSS & DE LEEUW MACHINE CO., NEW BRITAIN, CONN.

### LUCAS "PRECISION"

Horizontal Boring, Drilling and Milling Machine

### THE LUCAS MACHINE TOOL CO.



CLEVELAND,  
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### Golf . . . . . Outdoor Sports

Long Summer Days in the glorious out-of-doors, Cool Nights for Perfect Rest, the Charming Hospitality of the original Treadway Inn make a never-to-be-forgotten holiday.



## WILLIAMS INN

On the Campus at Williams College.  
Excellent Golf, Tennis, Lovely Bridle Paths . . . the peace of a lovely old New England Village.

L. G. Treadway, Managing Director

WILLIAMSTOWN, MASS.

## ...MEN IN THE MAJOR LEAGUES

Those men every community regards as leaders . . . in turn demand similar superior performance. In Chicago these men find at The Stevens the atmosphere . . . the comfort they demand of a hotel. That's the reason they call The Stevens, "America's Grand Hotel." Their strongest endorsements are their repeated autographs on our register.

OTTO K. EITEL, Managing Director



Room, with Bath, from \$3

## Acceptance

Manufacturers who read The Iron Age place a high value on repeat orders. The latter represent product acceptance.

Manufacturers who advertise in The Iron Age do so partly because they know that 82% of the subscribers of this paper send in repeat subscription orders.





# for Strength • Density • Toughness in castings use 15% to 25% *Superior* PURE CHARCOAL IRON IN THE MIX

## *Castings*

such as internal combustion engine blocks, steam cylinders, pump bodies and the like . . . thin section castings and castings produced for severe service . . . require strength, density and toughness.

Extra strength . . . greater density . . . more toughness . . . as well as ready machinability, may be obtained readily by use of Superior Pure Charcoal Iron . . . 15% to 25% in the mix.

Superior Pure Charcoal Iron counteracts high sulphur in the mix . . . permits better graphitization of the carbon . . . produces uniform, homogenous castings, free from hard iron, small leaks, mis-runs, cold shuts and spongy spots. Scrap loss is reduced . . . quality of castings improved.

Sixteen grades of Superior Pure Charcoal Pig provide a wide variety of characteristics in finished castings.

Write our metallurgical department for recommendations.

## SUPERIOR CHARCOAL IRON CO. GRAND RAPIDS, MICHIGAN

Debevoise - Anderson Company, Inc., Eastern Representative  
NEW YORK • BOSTON • PHILADELPHIA

## A Wire Rope with an Established Reputation

When you install a Hercules (Red Strand) Wire Rope on your equipment you are not experimenting with an untried product, for its ability has been proven by its service record.

Hercules Wire Rope can always be identified by its one red strand, which is also our guarantee that its exceptional quality is constantly maintained.

ESTABLISHED 1857

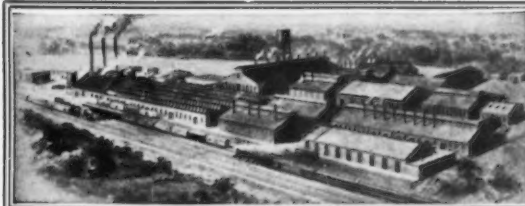
### A. LESCHEN & SONS ROPE COMPANY ST. LOUIS, MO.

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## THE ATHENIA STEEL CO.

Clifton Ave., Clifton, N. J.

Works, Athenia, N. J.

Makers of High Grade Tempered and Polished Steel for Clock, Watch, Motor and Typewriter Springs. Also Wound Springs. Tempered and Untempered Steel for other purposes. Special quality equal to finest imported for finish and accurate rolling. Also Stainless Steels of various grades.

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E. F. Krause & Co.—430-440 Commercial St., Los Angeles, Calif.  
Hill Chase & Co.—Richmond and Ontario Sts., Philadelphia, Pa.  
Wetherell Bros. Co.—251 Albany St., Cambridge, Mass.

# HOLCROFT & COMPANY

LEADERS IN BUILDING AND DESIGNING ELECTRIC AND COMBUSTION FURNACES, KILNS AND OVENS.  
HOME OFFICE: DETROIT—BRANCHES: CHICAGO, PHILADELPHIA  
CANADA: WALKER METAL PRODUCTS, LTD., WALKERVILLE, ONT.



# JUST BETWEEN US TWO

## Our Eyes Fill Up

UP to now Mothers' Days and Fathers' Days have always left us cold. The sentiment behind them seemed to us to be strictly of the cash register variety, and we could almost see the eager hands of candy, flower and necktie men making the wheels go 'round.

But we admit we were wrong, for a Pacific Coaster has sent in a subscription for his pater, to be presented as a Fathers' Day gift, and now we can see that this glorious American institution is really inspired by 24-kt. filial feeling.

## Grabber Bats 500

THE sharp-eyed foreign stamp-grabber in our mail receiving department is becoming ophthalmic. True, the Pushkin Centennial sent us by S. N. Baldwin of the Kharkov, U.S.S.R., tractor plant, never reached us. But the full set of South African coronation stamps sent us by R. W. Osborn of Johannesburg, got through owing to an oversight.

At least a dozen times in our life we have started a stamp collection. Each time we accumulated about twenty-seven stamps, which we mislaid and then sort of lost interest. But this time we are serious. Our stamp collection now consists of one full set of S.A. coronations. We will specialize in coronations, and will lay back quietly until someone gets crowned and then our philatelic frenzy will fulminate in full flower.

## We Crave Curves

IT seems to be an unwritten law these days that the girls in the ads look like either Katherine Hepburn or Greta Garbo. Take, for instance, the gal in the Ludlum ad on page 3 of the June 17 issue. She's a Hepburn. This concentration on exotics is unfair to those of us who prefer the old-fashioned type with well-filled joints. Therefore, a big hand to Lebanon Steel Foundry for its page 82 (June 17 issue) refusal to accept the edict that if she isn't angular she isn't attractive.

## Eye-Flagger

"ONLY God can make a tree" . . . but men can save it.—B. F. Goodrich Co., page 7, June 17, Iron Age.

## Erring 'Eckler

OUR fan, McC., who sees the flyspecks but never the painting, sneers at our claim to more than 600 advertisers. "I took a look at your advertisers' index," he says, "and judged that 300 was enough. So I infer that you have so many that you can't show them all in one issue."

We will let McC. in on something we hoped to keep secret—if he won't let it go any further.

Not every advertiser is in every issue. Some are in every other week, others just once a month.

And the reason for that is this: *Were all to utilize fully the tremendous selling power of the world's greatest industrial paper the country's productive facilities would break under the strain.*

Despite the doubts of the anonymous Baltimore bane, Iron Age advertisers, laid end to end, total at the moment exactly 617.

## Dragged in by Hair

JOHN HOWE (Taylor-Wharton) Hall, master metallurgist and ex-cleated shoe man, tells us a miler steps six feet and a sprinter nine, but leaves in the air the cosmic question of whether either or both is in flight or on earth the greater part of the time.

Our contract requires us to keep the contents of this column connected, however remotely, with the industry. The only hook-up we can think of at the moment is that makers of cleats, shoe nails, lasts and such are subscribers for The Iron Age.

And, in looking over the list of recent new subscribers, we are delighted to see that the one, big happy family includes makers of such out-of-the-ordinary products as heddles, ensilage cutters, metal trimmings for jewelry boxes, forceps, veneer slicers, electric razors, egg scales, snaths . . . *Cut!* It is hardly necessary to mention that the incredible diversity of products made by Iron Age subscribers make it an extraordinarily potent advertising medium. We would not bother to state such an obvious truth were it not for the moronic McC., whose capacity for misconception is metempirical.

## Problem?

BLAME Phil (GE) Sowersby for this five-second insult to your intelligence:

*A man owed \$3. He had a \$2 bill, which he pawned for \$1.50, and then sold the pawn ticket to another man for \$1.50, who redeemed the \$2 bill. Who lost?*

—A.H.D.

# Products Index

## ABRASIVE WHEELS—See Grinding Wheels

## ABRASIVE CLOTH & PAPER

Norton Co., Worcester, Mass.

## ABRASIVES—Steel Shot and Grit

Panborn Corporation, Hagerstown, Md.

## ACCUMULATORS—Hydraulic

Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Hydraulik GmbH, Duisburg, Germany.

Wood, R. D. & Co., Philadelphia.

## ACETYLENE—Dissolved in Cylinders & Small Tanks

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

## ACID-PROOF CEMENT

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

## ACID-PROOF CONSTRUCTION

Atlas Mineral Prods. Co. of Pa., The, Meritown, Pa.

## ACIDS—Pickling

American Chemical Paint Co., Ambler, Pa.

Du Pont de Nemours, E. I. & Co., Inc., Grassell Chemicals Dept., Wilmington, Del.

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

## AIR CONDITIONING EQUIPMENT

American Blower Corp., 6000 Russell St., Detroit.

Clarage Fan Co., Kalamazoo, Mich.

## AIR TANKS AND CYLINDERS

Petroleum Iron Works Co., The, Sharon, Pa.

Scaife, William B. & Sons Co., Pith.

## ALLOYS—Copper

American Brass Co., The, Waterbury, Conn.

## ALLOYS—Ferro

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

## ALLOYS—Magnesium

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

## ALLOYS—Phosphor Bronze

Phosphor Bronze Smelting Co., The, Phila. Riverside (N. J.) Metal Co.

## ALLOYS—Resistance Welding

Electroloy Co., Inc., 50 Church St., New York City.

## ALLOYS—Titanium

Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

## ALLOYS—Tungsten

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

## ALLOYS—Vanadium

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

## ALLOYS—Zinc Base Die Casting

New Jersey Zinc Co., The, 160 Front St., N. Y. C.

## ALUMINUM

Aluminum Co. of America, Pittsburgh.

Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

## ANMMETERS AND VOLTMETERS—Recording

Leeds & Northrup Co., Philadelphia.

## AMMONIA RECOVERY PLANTS

Koppers Co., Pittsburgh.

## ANGLES, BEAMS, CHANNELS AND TEES

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Ryerson, Jos. T. & Son, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Steel & Tubes, Inc., Cleveland.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Weirton (W. Va.) Steel Co.

## ANGLES, BEAMS, CHANNELS & TEES—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

## ANNEALING—See Heat Treating

## ANNEALING BOXES

Lebanon (Pa.) Steel Foundry.

Petroleum Iron Works Co., The, Sharon, Pa.

United Engineering & Fdry. Co., Pith.

## ANNEALING COVERS

Petroleum Iron Works Co., The, Sharon, Pa.

Surface Combustion Corp., 2375 Dorr St., Toledo.

## ANODES—All Types

Du Pont de Nemours, E. I. & Co., Inc., Grassell Chemicals Dept., Wilmington, Del.

Seymour (Conn.) Mfg. Co.

Udylite Co., The, Detroit.

## ANODES—Cadmium

Du Pont de Nemours, E. I. & Co., Inc., Grassell Chemicals Dept., Wilmington, Del.

Udylite Co., The, Detroit.

## ARBORS

Cincinnati (Ohio) Milling Mch. Co., The, Morse Twist Drill & Mch. Co., New Bedford, Mass.

## ARMORING MACHINERY—Cable, Wire, Hose

Sleeper & Hartley, Inc., Worcester, Mass.

## ARRESTERS—Spark

Harrington & King Perforating Co., Chicago.

## ASBESTOS

Carey, Philip, Co., The, Cincinnati.

## AXLES—Car or Locomotive

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

## BALANCING EQUIPMENT

Cisholt Machine Co., Madison, Wis.

## BALING PRESSES—Scrap—See Presses—Baling

## BALLS—Burnishing

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Hartford (Conn.) Steel Ball Co., The.

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Hartford (Conn.) Steel Ball Co., The.

New Departure Div., General Motors Corp., Bristol, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

## BANDS—Steel

Acme Steel Co., Chicago.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

## BANDS—Welded

Amer. Welding & Mfg. Co., Warren, O.

## BARRELS—Burnishing

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Ranshoff, N. Inc., Cincinnati.

## BARRELS—Tumbling

Baird Mch. Co., The, Bridgeport, Conn.

Hartford (Conn.) Steel Ball Co., The.

Ranshoff, N. Inc., Cincinnati.

Whitling Corp., Harvey, Ill.

## BARS—Alloy

Republic Steel Corp., Cleveland, Ohio.

## BARS—Aluminum

Aluminum Co. of America, Pittsburgh.

## BARS—Brass, Bronze or Copper

Hunting Brass & Bronze Co., Toledo, Ohio.

Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

## BARS—Cold Drawn

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Bliss & Laughlin, Inc., Harvey, Ill.

Union Drawn Steel Co., Massillon, Ohio.

## BARS—Concrete, Reinforcing

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Jones & Laughlin Steel Corp., Pittsburgh.

Laclede Steel Co., St. Louis, Mo.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

## BARS—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

## BARS—Steel

Ames, W. & Co., Jersey City, N. J.

Andrews Steel Co., The, Newport, Ky.

Bethlehem (Pa.) Steel Company.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Great Lakes Steel Corp., Detroit.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T. & Son, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Steel & Tubes, Inc., Cleveland.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Weirton (W. Va.) Steel Co.

Youngstown (Ohio) Sheet & Tube Co., The.

## BATTERIES—Storage

Electric Storage Battery Co., The, Phila.

## BATTERY CHARGERS

Cutler-Hammer, Inc., Milwaukee.

## BEAMS—See Angles, Beams, Channels and Tees

## BEARINGS—Babbitt

Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

## BEARINGS—Ball

Bantam Bearings Corp., The, South Ben. Indiana.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

New Departure Div., General Motors Corp., Bristol, Conn.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Schatz Mfg. Co., Poughkeepsie, N. Y.



# Products Index

## BEARINGS—Brass and Bronze

Ampco Metal, Inc., Milwaukee, Wis.  
Bunting Brass & Bronze Co., Toledo, O.  
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.  
Lawrenceville Bronze Co., Pittsburgh.  
National Bearing Metals Corp., Pittsburgh, Pa.

## BEARINGS—Oilless

Bunting Brass & Bronze Co., Toledo, O.  
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.  
Richardson Co., The, Melrose Park, Ill.

## BEARINGS—Quill

Bantam Bearings Corp., The, South Bend, Indiana.

## BEARINGS—Radial

Bantam Bearings Corp., The, South Bend, Indiana.  
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.  
Hyatt Bearings Div., General Motors Corp., Newark, N. J.

New Departure Div., General Motors Corp., Bristol, Conn.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

## BEARINGS—Roll Neck

Bantam Bearings Corp., The, South Bend, Indiana.

Morgan Construction Co., Worcester, Mass.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

Timken Roller Bearing Co., The, Canton, O.

## BEARINGS—Roller

Bantam Bearings Corp., The, South Bend, Indiana.

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

Standard Machinery Co., Providence, R. I.

Timken Roller Bearing Co., The, Canton, O.

## BEARINGS—Roller Tapered

Bantam Bearings Corp., The, South Bend, Indiana.

Timken Roller Bearing Co., The, Canton, O.

## BEARINGS—Rolling Mill Equipment

Bantam Bearings Corp., The, South Bend, Indiana.

Richardson Co., The, Melrose Park, Ill.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Timken Roller Bearing Co., The, Canton, O.

## BEARINGS—Self-aligning Roller

Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

## BEARINGS—Shaft Hanger

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

## BEARINGS—Thrust

Bantam Bearings Corp., The, South Bend, Indiana.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

New Departure Div., General Motors Corp., Bristol, Conn.

Norma-Hoffmann Bearings Corp., Stamford, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

Timken Roller Bearing Co., The, Canton, O.

## BELT DRESSING

Rhoads, J. E., & Sons, Philadelphia.

## BELT LACING

Rhoads, J. E., & Sons, Philadelphia.

## BELT—Conveyor, Elevator

Goodrich, B. F. Co., The, Akron, Ohio.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

Robins Conveying Belt Co., 15 Park Row, N. Y. C.

## BELTING—Cement

Rhoads, J. E., & Sons, Philadelphia.

## BELTING—Leather

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

Rhoads, J. E., & Sons, Philadelphia.

Belting—Metal, Conveyor, High and Low Temperature

Acme Steel Co., Chicago, Ill.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

Belting—Rubber

Goodrich, B. F. Co., The, Akron, Ohio.

Goodyear Tire & Rubber Co., Akron, Ohio.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

Robins Conveying Belt Co., 15 Park Row, N. Y. C.

## BELTS—V-Type

Allis-Chalmers Mfg. Co., Milwaukee.  
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

## BENDING MACHINES—Hand, Band and Angle

Excelsior Tool & Mch. Co., E. St. Louis, Ill.

## BENDING MACHINES—Hand and Power

Cincinnati (Ohio) Shaper Co., The.  
Dreis & Krump Mfg. Co., Chicago.

G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.

Kane & Roach, Inc., Syracuse, New York.

Niagara Machine & Tool Works, Buffalo, N. Y.

## BENZOL RECOVERY PLANTS

Koppers Co., Pittsburgh.

## BERYLLIUM COPPER

American Brass Co., The, Waterbury, Conn.

Riverside (N. J.) Metal Co.

## BILLETS—Alloy Steel

Andrews Steel Co., The, Newport, Ky.

## BILLETS—Carbon Steel

Andrews Steel Co., The, Newport, Ky.

## BILLETS—Carbon Vanadium Steel

Andrews Steel Co., The, Newport, Ky.

## BILLETS—Chrome Nickel Steel

Andrews Steel Co., The, Newport, Ky.

## BILLETS—Chrome Steel

Andrews Steel Co., The, Newport, Ky.

## BILLETS—Die Black Steel

Andrews Steel Co., The, Newport, Ky.

## BILLETS—Forging

Alan Wood Steel Co., Conshohocken, Pa.

Andrews Steel Co., The, Newport, Ky.

Central Iron & Steel Co., Harrisburg, Pa.

Harrisburg (Pa.) Steel Corp.

Midvale Co., The, Nicetown, Phila., Pa.

Republic Steel Corp., Cleveland, Ohio.

## BILLETS—Nickel Steel

Andrews Steel Co., The, Newport, Ky.

## BILLETS—Re-rolling

Alan Wood Steel Co., Conshohocken, Pa.

Andrews Steel Co., The, Newport, Ky.

## BILLETS—Steel

Bethlehem (Pa.) Steel Company.

Continental Steel Corp., Kokomo, Ind.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

## BINS—Rotating

Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

## BLANKS—Chisel

Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

## BLANKS—Gear and Pinion

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

Richardson Co., The, Melrose Park, Ill.

## BLANKS—Gear, Silent Steel

Waldron, John, Corp., New Brunswick, N. J.

## BLAST CLEANING EQUIPMENT

American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

Pangborn Corporation, Hagerstown, Md.

## BLAST FURNACES

Brassett, H. A., & Co., Chicago, Ill.

## BLAST GATES

Rockwell, W. S., Co., 50 Church St., N. Y. C.

## BLOCKS—Chain

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

## BLOWERS

American Blower Corp., 6000 Russell St., Detroit.

Bendix Products Corp., 413 Bendix Drive, South Bend, Ind.

Clarage Fan Co., Kalamazoo, Mich.

North American Mfg. Co., The, Cleveland.

Spencer Turbine Co., Hartford, Conn.

## BLOWPIPES—Oxy-Acetylene Welding & Cutting

Linde Air Prods. Co., The, 30 E. 42nd St., N. Y. C.

Weldit Acetylene Co., Detroit.

## BLOWPIPES—Soldering, Heating, Annealing

American Gas Furnace Co., Elizabeth, N. J.

Torrit Mfg. Co., St. Paul, Minn.

Weldit Acetylene Co., Detroit.

## BOILERS

Munroe R., & Sons Mfg. Corp., Pittsburgh.

## BOILERS—Waste Heat

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

## BOILERS—Water Tube

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

## BOLT CUTTERS

Landis Mch. Co., Inc., Waynesboro, Pa.

## BOLT AND NUT MACHINERY

Landis Machine Co., Inc., Waynesboro, Pa.

Manville, E. J., Mch. Co., Waterbury, Ct.

Farrel Fdry. & Mch. Co., The.

## BOLT & RIVET CLIPPERS

Bremil Mfg. Co., Erie, Pa.

Helwig Mfg. Co., St. Paul, Minn.

## BOLTS—Carriage and Machine

Cleveland (Ohio) Cap Screw Co., The

Erie (Pa.) Bolt & Nut Co.

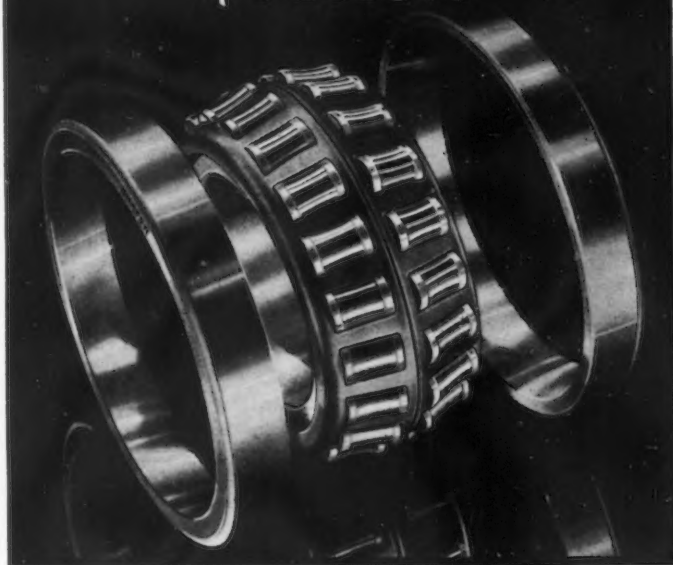
Lamson & Sessions Co., The, Cleveland.

Oliver Iron & Steel Corp., Pittsburgh.

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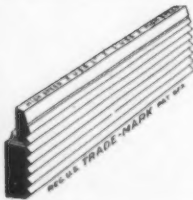
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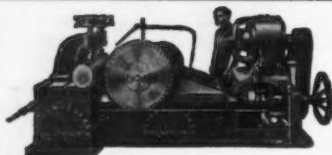
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## Products Index

- BOLTS—Special**  
 Erie (Pa.) Bolt & Nut Co.  
 Oliver Iron & Steel Corp., Pittsburgh.  
 Republic Steel Corp., Upson Nut Div., Cleveland, O.  
 Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
- BOLTS—Special, Hot or Cold Upset**  
 Lamson & Sessions Co., The, Cleveland.  
 Oliver Iron & Steel Corp., Pittsburgh.
- BOLTS—Steel**  
 Blake & Johnson Co., The, Waterville, Ct.  
 Lamson & Sessions Co., The, Cleveland.
- BOLTS—Track**  
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
 Republic Steel Corp., Upson Nut Div., Cleveland, O.
- BOLTS AND NUTS**  
 Ames, W. & Co., Jersey City, N. J.  
 Clark Bros. Bolt Co., Milldale, Conn.  
 Erie (Pa.) Bolt & Nut Co.  
 Helz & Helz, Inc., 33-34th St., Brooklyn, N. Y.  
 Oliver Iron & Steel Corp., Pittsburgh.  
 Republic Steel Corp., Cleveland, Ohio.  
 Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
- BOND—Grinding Wheel**  
 Bakelite Corp., 247 Park Ave., N. Y. C.
- BOOTH—Spray**  
 DeVilbiss Co., The, Toledo, Ohio.
- BORING BARS**  
 Bullard Co., The, Bridgeport, Conn.
- BORING, DRILLING & MILLING MACHINES—Horizontal**  
 Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.  
 Lucas Machine Tool Co., Cleveland.  
 National Automatic Tool Co., Richmond, Ind.
- BORING & DRILLING MACHINES—Vertical**  
 Baker Bros., Inc., Toledo, Ohio.  
 Bullard Co., The, Bridgeport, Conn.
- BORING MACHINES—Diamond**  
 Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
- BORING MACHINES—Diamond & Carbide**  
 Heald Mch. Co., Worcester, Mass.
- BORING MACHINES—Jig**  
 Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
- BORING & TURNING MILLS—Vertical**  
 Bullard Co., The, Bridgeport, Conn.  
 Cincinnati (Ohio) Planer Co.
- BOX STRAPPING**  
 Acme Steel Co., Chicago, Ill.
- BRAKE LINING AND BLOCKS—Asbestos**  
 Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
- BRAKES—Electric**  
 Cutler-Hammer, Inc., Milwaukee.
- BRAKES—Electric & Mechanical**  
 Clark Controller Co., The, Cleveland.  
 Electric Controller & Mfg. Co., The, Cleveland.
- BRAKES—Magnetic**  
 Stearns Magnetic Mfg. Co., 626 So. 28th St., Milwaukee.
- BRAKES—Metal Forming**  
 Cincinnati (Ohio) Shaper Co., The.  
 Dreis & Krump Mfg. Co., Chicago.  
 Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
 Steelwell Machinery Co., Cleveland.
- BRICK—Fire Clay**  
 Carborundum Co., The, Niagara Falls, N. Y.  
 Illinois Clay Products Co., Joliet, Ill.  
 Quigley Co., Inc., 56 West 45th St., N. Y. C.
- BRICK—Insulating**  
 Babcock & Wilcox Co., The, 85 Liberty St., New York City.
- BRIDGE BUILDERS**  
 American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
 Belmont Iron Works, Philadelphia.
- BRIDGE OPERATING MACHINERY—Movable**  
 Earle Gear & Mch. Co., Philadelphia.
- BRIQUETS—Ferroalloy**  
 Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.
- PROACHING MACHINES**  
 Bullard Co., The, Bridgeport, Conn.  
 Cincinnati (Ohio) Milling Mch. Co., The.  
 Oilgear Co., The, 1311 W. Bruce St., Milwaukee.
- BRONZE FOR DIES**  
 Ameco Metal, Inc., Milwaukee, Wis.
- BRONZE—Phosphor**  
 Bunting Brass & Bronze Co., Toledo, Ohio.  
 Phosphor Bronze Smelting Co., The, Phila.  
 Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.  
 Riverside (N. J.) Metal Co.  
 Seymour (Conn.) Mfg. Co.
- BRUSHES—Machine**  
 Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.
- BRUSHES—Wire**  
 Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.
- BUCKETS—Clamshell**  
 Blaw-Knox Co., Pittsburgh.  
 Hayward Co., The, 50 Church St., N. Y. C.  
 Industrial Brownhoist Corp., Bay City, Mich.
- BUCKETS—Electric Motor**  
 Hayward Co., The, 50 Church St., N. Y. C.
- BUCKETS—Elevator**  
 Jeffrey Mfg. Co., The, Columbus, Ohio.
- BUCKETS—Orange Peel**  
 Hayward Co., The, 50 Church St., N. Y. C.
- BUFFERS & POLISHING MACHINES**  
 Packer Machine Co., Meriden, Conn.  
 Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.
- BUFFING APPLICATORS—Automatic**  
 Packer Machine Co., Meriden, Conn.
- BUILDINGS—Factory**  
 Ferguson, H. K., Co., The, Cleveland.
- BUILDINGS—Steel**  
 American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
 Belmont Iron Works, Philadelphia.  
 Bethlehem (Pa.) Steel Co.  
 Blaw-Knox Co., Pittsburgh.  
 Ferguson, H. K., Co., The, Cleveland.
- BULLDOZERS**  
 Beatty Mch. & Mfg. Co., 936-150th St., Hammond, Ind.  
 Steelwell Machinery Co., Cleveland.
- BULLDOZERS—Hydraulic**  
 Elmes, Chas. F., Engng. Wks., Chicago.
- BURNERS—Oil or Gas**  
 North American Mfg. Co., The, Cleveland.
- BUSHINGS—Bronze**  
 Ameco Metal, Inc., Milwaukee, Wis.  
 Bunting Brass & Bronze Co., Toledo, O.  
 Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.  
 Lawrenceville Bronze Co., Pittsburgh.  
 Phosphor Bronze Smelting Co., The, Phila.  
 Shenango-Penn Mold Co., Pittsburgh.
- BUSHINGS—Oilless**  
 Rhoades, R. W., Metalline Co., Inc., Long Island City, N. Y.
- BUSHINGS—Phosphor Bronze**  
 Bunting Brass & Bronze Co., Toledo, Ohio.  
 Phosphor Bronze Smelting Co., The, Phila.
- BY-PRODUCTS COKE AND GAS OVENS**  
 Koppers Co., Pittsburgh.
- CABINETS—Stock**  
 Frick-Gallagher Mfg. Co., The, Wellston, Ohio.
- CABLE—Electric**  
 General Electric Co., Schenectady, N. Y.  
 Simplex Wire & Cable Co., Cambridge A. Boston, Mass.
- CABLEWAYS AND TRAMWAYS—See Tramways**
- CADMIUM**  
 Du Pont de Nemours, E. I. & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.  
 Udyllite Co., The, Detroit.
- CADMIUM PLATING PROCESS**  
 Du Pont de Nemours, E. I. & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.  
 Udyllite Co., The, Detroit.
- CALCIUM METAL & ALLOYS**  
 Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.
- CALCULATING MACHINES**  
 Monroe Calculating Machine Co., Inc., Orange, N. J.
- CARBIC**  
 Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
- CARBIDE**  
 Air Reduction Sales Co., 60 East 42nd St., N. Y. C.  
 Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.
- CARBIDE—Boron**  
 Norton Co., Worcester, Mass.
- CARBURIZING—See Heat Treating**
- CARS—Industrial and Mining**  
 Atlas Car & Mfg. Co., The, Cleveland.  
 Bartlett, C.O., & Snow Co., The, Cleveland.
- CASE HARDENING—See Heat Treating**
- CASTINGS—Acid or Heat Resisting**  
 Ameco Metal, Inc., Milwaukee, Wis.  
 Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.  
 Hoskins Mfg. Co., Detroit, Mich.  
 Lebanon (Pa.) Steel Foundry.  
 Midvale Co., The, Nicetown, Phila., Pa.  
 Mechanite Metal Corp., Pittsburgh.
- CASTINGS—Alloy Iron**  
 Forging & Casting Corp., The, Ferndale, Mich.
- CASTINGS—Alloy Steel**  
 Bissett Steel Co., The, Cleveland.  
 Dodge Steel Co., Philadelphia, Pa.  
 Lebanon (Pa.) Steel Foundry.  
 Mackintosh-Hemphill Co., Pittsburgh.  
 Midvale Co., The, Nicetown, Phila., Pa.

# Products Index

## CASTINGS—Aluminum

Aluminum Co. of America, Pittsburgh.

## CASTINGS—Brass, Bronze, Copper or Aluminum

Cadman, A. W. Mfg. Co., Pittsburgh.  
Carbon Malleable Casting Co., Inc., Lancaster, Pa.  
Lawrenceville Bronze Co., Pittsburgh.  
National Bearing Metals Corp., Pittsburgh, Pa.

Phosphor Bronze Smelting Co., The, Phila. Snyder, W. P. & Co., Pittsburgh.  
Spencer's, I. S. Sons, Inc., Guilford, Ct.

## CASTINGS—Corrosion Resisting

Meehanite Metal Corp., Pittsburgh.  
Midvale Co., The, Nicetown, Phila., Pa.

## CASTINGS—Die, Aluminum

Aluminum Co. of America, Pittsburgh.

## CASTINGS—Electric Steel

Dodge Steel Co., Philadelphia, Pa.  
Industrial Steel Casting Co., The, Toledo, Lebanon (Pa.) Steel Foundry.

## CASTINGS—Gray Iron

American Engineering Co., Philadelphia.  
Cheney, S. & Son, Manlius, N. Y.  
Midvale Co., The, Nicetown, Phila., Pa.  
Murray Iron Wks. Co., Burlington, Iowa.  
National Roll & Fdry. Co., Avonmore, Pa.  
North Wales (Pa.) Mach. Co., Inc.  
Spencer's, I. S. Sons, Inc., Guilford, Ct.

## CASTINGS—High Test & Alloy Iron

Meehanite Metal Corp., Pittsburgh.

## CASTINGS—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

## CASTINGS—Malleable

Carbon Malleable Casting Co., Inc., Lancaster, Pa.  
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.  
Malleable Iron Fittings Co., Branford, Ct.  
Peoria (Ill.) Malleable Castings Co.

## CASTINGS—Meehanite Metal

Meehanite Metal Corp., Pittsburgh.

## CASTINGS—Monel & Nickel

Superior Bronze Corp., Erie, Pa.

## CASTINGS—Semi-Steel

Malleable Iron Fittings Co., Branford, Ct.

## CASTINGS—Steel

Bethlehem (Pa.) Steel Company.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.  
Crucible Steel Castings Co., Lansdowne, Pa.

Dodge Steel Co., Philadelphia, Pa.  
Industrial Steel Castings Co., The, Toledo, Lebanon (Pa.) Steel Foundry.

Mackintosh-Hemphill Co., Pittsburgh.  
Malleable Iron Fittings Co., Branford, Ct.

Mesta Mach. Co., Pittsburgh.  
Midvale Co., The, Nicetown, Phila., Pa.

Standard Steel Wks. Co., Burnham, Pa.

## CASTINGS—Wear Resisting

Meehanite Metal Corp., Pittsburgh.

## CEMENT—Acid-Proof

Atlas Mineral Products Co. of Pa., The, Merztown, Pa.  
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

## CEMENT—Quick Setting, Acid Proof & Insulator

Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

## CEMENT—Refractory

Carborundum Co., The, Perth Amboy, N. J.  
Johns-Manville Corp., 22 East 40th St., New York City.  
Quigley Co., Inc., 56 West 45th St., N. Y. C.

## CEMENT—Rubber

Goodrich, B. F. Co., The, Akron, Ohio.

## CHAINS—Conveyor & Elevator

Baldwin-Duckworth Chain Corp., Springfield, Mass.

Bartlett, C. O. & Snow Co., The, Cleveland.  
Diamond Chain & Mfg. Co., Indianapolis, Ind.

Jeffrey Mfg. Co., The, Columbus, Ohio.

## CHAINS—Power Transmission

Baldwin-Duckworth Chain Corp., Springfield, Mass.

Boston Gear Works, Inc., North Quincy, Mass.

Diamond Chain & Mfg. Co., Indianapolis, Ind.

Jeffrey Mfg. Co., The, Columbus, Ohio.  
Link-Belt Co., Chicago.

Morse Chain Co., Ithaca, New York.  
Whitney Chain & Mfg. Co., Hartford, Ct.

## CHAINS—Roller

Baldwin-Duckworth Chain Corp., Springfield, Mass.

Bartlett, C. O. & Snow, Co., The, Cleveland.  
Diamond Chain & Mfg. Co., Indianapolis, Ind.

Link-Belt Co., Chicago.  
Morse Chain Co., Ithaca, New York.

Whitney Chain & Mfg. Co., Hartford, Ct.

## CHAINS—Silent

Link-Belt Co., Chicago.  
Morse Chain Co., Ithaca, New York.  
Whitney Chain & Mfg. Co., Hartford, Ct.

## CHANNELS—See Angles, Beams, Channels and Tees

## CHECKS—Metal

Cunningham, M. E., Co., Pittsburgh.  
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

## CHEMICALS—Industrial

Du Pont de Nemours, E. I., & Co., Inc., Grasseil Chemicals Dept., Wilmington, Del.

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

## CHEMICALS—Rust Proofing

Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

Udyllite Co., The, Detroit.

## CHROMIUM METAL & ALLOYS

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

## CHUCKING MACHINES—Multiple Spindle

Baird Mach. Co., The, Bridgeport, Conn.  
Goss & DeLeeuw Machine Co., New Britain, Conn.

National Acme Co., The, Cleveland.

## CHUCKS—Air Operated

Hannifin Mfg. Co., Chicago.

## CHUCKS—Drill

Cleveland (Ohio) Twist Drill Co., The.  
Morse Twist Drill & Mach. Co., New Bedford, Mass.

## CHUCKS—Magnetic

Heald Mach. Co., Worcester, Mass.  
Taft-Peirce Mfg. Co., The, Woonsocket, R.I.

## CIRCLES—Phosphor Bronze

Phosphor Bronze Smelting Co., The, Phila.  
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Riverside (N. J.) Metal Co.

## CLEANERS—Metal

American Chemical Paint Co., Ambler, Pa.  
Detroit Rex Products Co., Detroit, Mich.

Ford, J. B. Co., The, Wyandotte, Mich.  
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

Pennsylvania Salt Mfg. Co., Phila., Pa.

## CLEANING COMPOUNDS—Alkali

Detroit Rex Products Co., Detroit, Mich.  
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

## CLEANING EQUIPMENT—Metal

Detroit Rex Products Co., Detroit, Mich.

## CLEANING EQUIPMENT (Metal)—Electro-Chemical

Bullard Co., The, Bridgeport, Conn.

## CLEANING MATERIALS—Glass

Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

## CLUTCH-BRAKES—Magnetic

Stearns Magnetic Mfg. Co., 626 So. 28th St., Milwaukee.

## CLUTCHES

Fairbanks, Morse & Co., Chicago.  
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

Medart Co., The, St. Louis, Mo.

Morse Chain Co., Ithaca, New York.

## CLUTCHES—Magnetic

Cutler-Hammer, Inc., Milwaukee.  
Dings Magnetic Separator Co., Milwaukee.

Stearns Magnetic Mfg. Co., 626 South 28th St., Milwaukee.

## CLUTCHES—Overrunning

Morse Chain Co., Ithaca, New York.

## COAL

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

Hanna Furnace Corp., The, Detroit, Mich.  
Koppers Coal Co., Inc., The, Pittsburgh.

Pickands Mather & Co., Cleveland.

## COAL ORE AND ASH HANDLING MACHINERY

Bartlett, C. O. & Snow Co., The, Cleveland.  
Jeffrey Mfg. Co., The, Columbus, Ohio.

Robins Conveying Belt Co., 15 Park Row, N. Y. C.

## COBALT METAL

Central Trading Corp., 511 Fifth Ave., N. Y. C.

## COILS—Pipe

Harrisburg (Pa.) Steel Corp.

## COKE—Metallurgical

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.

Pickands Mather & Co., Cleveland.

## COKE OVEN MACHINERY

Atlas Car & Mfg. Co., The, Cleveland.  
Koppers Co., Pittsburgh.

## COKE OVENS—By-Products

Koppers Co., Pittsburgh.

## COKE OVENS—Cross Regenerators

Koppers Co., Pittsburgh.

## COKE OVENS—With Recovery of By-Products

Koppers Co., Pittsburgh.

## COLLETS

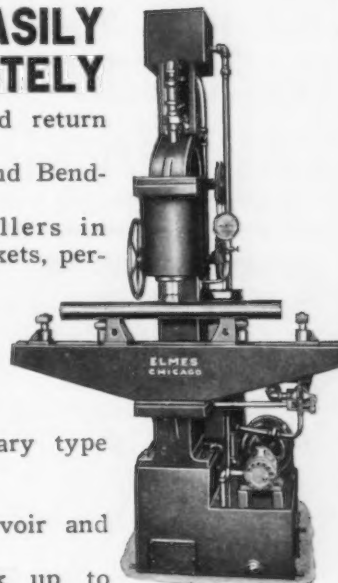
Rivett Lathe & Grinder, Inc., Boston, Mass.

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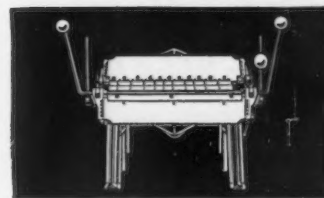
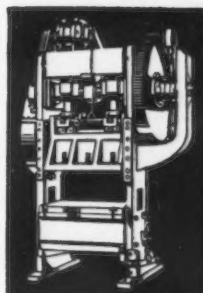
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COMPLETE LINE OF PRESSES, SHEARS AND BRAKES

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SINCE 1871

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### SALES AGENTS

NEW YORK CITY — Wm. H. Leonori & Co., Inc., 30 Howard St.  
PHILADELPHIA — C. B. Tippet, 4308 North Broad St.  
CHICAGO — Central Steel & Wire Co., 4545 South Western Blvd.  
DETROIT — E. R. Wegener, 514 Stephenson Bldg.  
CLEVELAND — Paterson-Leitch Co., 900 East 69th St.  
BUFFALO — J. J. Lambert, 323 Huntington Ave.  
DAYTON — Central Steel & Wire Co., 1095 East Monument Ave.  
SAN FRANCISCO — Charles L. Lewis, 703 Market St.

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## Products Index

### COLUMBIUM

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

### COMBUSTION CONTROLS

Leeds & Northrup Co., Philadelphia.  
Morgan Construction Co., Worcester, Mass.  
North American Mfg. Co., The, Cleveland.

### COMPOUNDS—Drawing

Gulf Oil Corp., Gulf Refining Co., Pittsburgh.  
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.  
Standard Oil Co. (Indiana), Chicago.  
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

### COMPRESSORS—Air

Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.  
Fairbanks, Morse & Co., Chicago.  
Ingersoll-Rand Co., 11 Broadway, New York City.  
Pennsylvania Pump & Compressor Co., Easton, Pa.  
Speer Turbine Co., Hartford, Conn.  
Sullivan Machinery Co., Michigan City, Ind.  
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.  
Worthington Pump & Machinery Corp., Harrison, N. J.

### COMPRESSORS—Gas

Sullivan Machinery Co., Michigan City, Ind.  
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

### CONCRETE CONSTRUCTION

Ferguson, H. K., Co., The, Cleveland.

### CONDENSERS—Surface & Jet

Ingersoll-Rand Co., 11 Broadway, N.Y.C.  
Pennsylvania Pump & Compressor Co., Easton, Pa.  
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.  
Worthington Pump & Machinery Corp., Harrison, N. J.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature  
Leeds & Northrup Co., Philadelphia.

### CONTROLLERS—Crane

Cutler-Hammer, Inc., Milwaukee.

### CONTROLLERS—Electric

Clark Controller Co., The, Cleveland.  
Cutler-Hammer, Inc., Milwaukee.  
Electric Controller & Mfg. Co., The, Cleveland.  
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated

Cutler-Hammer, Inc., Milwaukee.  
Leeds & Northrup Co., Philadelphia.

### CONVEYING AND ELEVATING MACHINERY

Bartlett, C. O., & Snow, Co., The, Cleveland.  
Jeffrey Mfg. Co., The, Columbus, Ohio.  
Link-Belt Co., Chicago.  
Logan Co., Inc., Louisville, Ky.  
Mathews Conveyor Co., Ellwood City, Pa.  
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

### CONVEYOR WORMS

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

### CONVEYORS—Flexible Wire Belt

Audubon Wire Cloth Corp., Phila., Pa.

### CONVEYORS—Gravity

Logan Co., Inc., Louisville, Ky.  
Mathews Conveyor Co., Ellwood City, Pa.

### CONVEYORS—Monorail

American Monorail Co., The, Cleveland.  
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

### CONVEYORS—Portable

Jeffrey Mfg. Co., The, Columbus, Ohio.  
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

### COPING MACHINES

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

### CORE OIL

Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.  
Sun Oil Co., Philadelphia.  
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS—See Grinding Wheels

### COTTERS AND KEYS—Spring

Hindley Mfg. Co., Valley Falls, R. I.  
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.  
Western Wire Prods. Co., St. Louis, Mo.

### COUNTERBORES

Cleveland (Ohio) Twist Drill Co., The.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.

### COUNTERS—Production

Durant Mfg. Co., Milwaukee, Wis.  
Veeder-Root, Inc., Hartford, Ct.

### COUNTERS—Revolution, Recording

Durant Mfg. Co., Milwaukee, Wis.

### COUNTING MACHINES

Veeder-Root, Inc., Hartford, Conn.

### COUPLINGS—Cut-off Friction

Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

### COUPLINGS—Flexible

Diamond Chain & Mfg. Co., Indianapolis, Ind.  
Lovejoy Flexible Coupling Co., Chicago.  
Morse Chain Co., Ithaca, New York.  
Waldron, John, Corp., New Brunswick, N. J.

### COUPLINGS—Pipe

Harrisburg (Pa.) Steel Corp.  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

### CRANES—Crawling Tractor

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.  
Industrial Brownhoist Corp., Bay City, Mich.  
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

### CRANES—Electric, Industrial, Truck Mounted

Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.  
Elwell-Parker Electric Co., The, Cleveland.

### CRANES—Electric Traveling

Armstrong, James P., Pittsburgh.  
Cleveland Crane & Engineering Co., Wickliffe, Ohio.  
Conco Engineering Works, Mendota, Ill.  
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.  
Electric Hoist & Motor Co., 149 N. 9th St., Bklyn., N. Y.  
Euclid Crane & Hoist Co., The, Euclid, O.  
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.  
Morgan Engineering Co., The, Alliance, O.  
Northern Engineering Works, Detroit, Mich.  
Robbins & Myers, Inc., Springfield, Ohio.  
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.  
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.  
Whiting Corp., Harvey, Ill.

### CRANES—Gantry

Cleveland Crane & Engineering Co., Wickliffe, Ohio.  
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.  
Morgan Engineering Co., The, Alliance, O.  
Whiting Corp., Harvey, Ill.

### CRANES—Hand Power

American Monorail Co., The, Cleveland.  
Cleveland Crane & Engineering Co., Wickliffe, Ohio.  
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.  
Conco Engineering Works, Mendota, Ill.  
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.  
Euclid Crane & Hoist Co., The, Euclid, O.  
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.  
Industrial Brownhoist Corp., Bay City, Mich.  
Northern Engineering Works, Detroit.  
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

### CRANES—Jib

American Monorail Co., The, Cleveland.  
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.  
Conco Engineering Works, Mendota, Ill.  
Euclid Crane & Hoist Co., The, Euclid, O.  
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.  
Whiting Corp., Harvey, Ill.

### CRANES—Locomotive

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.  
Industrial Brownhoist Corp., Bay City, Mich.  
Ohio Locomotive Crane Co., The, Bucyrus, O.

### CRANES—Monorail

American Monorail Co., The, Cleveland.  
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.  
Euclid Crane & Hoist Co., The, Euclid, O.  
Northern Engineering Works, Detroit.  
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.  
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

### CRANES—Portable

Canton Fdry. & Mch. Co., Cleveland.

### CRANES—Portable Electric

Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.  
Elwell-Parker Electric Co., The, Cleveland.

### CRANKSHAFTS

Union Drawn Steel Co., Massillon, Ohio.

### CRUSHERS—Coal

American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.  
Jeffrey Mfg. Co., The, Columbus, Ohio.



# Products Index

## CRUSHERS—Steel Turning

American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

## CUTTERS—Die Sinking

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.  
Tomkins-Johnson Co., The, Jackson, Mich.

## CUTTERS—Keyseating

Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

## CUTTERS—Milling

Brown & Sharpe Mfg. Co., Providence, R.I.  
Cleveland (Ohio) Twist Drill Co., The.  
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.  
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

## CUTTING-OFF MACHINES—Abrasives

Tabor Mfg. Co., Phila.

## CUTTING-OFF MACHINES—Cold Saw

Espen-Lucas Mch. Wks., Philadelphia.  
Heller Machine Co., 114 Liberty St., N. Y. C.

## CUTTING-OFF MACHINES—Pipe or

Tubing

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Bardons & Oliver, Cleveland.

Landis Mch. Co., Inc., Waynesboro, Pa.

## CUTTING AND WELDING APPARATUS

—Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

## CYLINDERS—Compressed Air & Hydraulic

Tomkins-Johnson Co., The, Jackson, Mich.

## CYLINDERS—Seamless

Harrisburg (Pa.) Steel Corp.

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

## DEGREASING COMPOUNDS

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

## DEGREASING MACHINES—Solvent

Detroit Rex Products Co., Detroit, Mich.

## DEOXIDIZERS

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

## DICTATING MACHINES

Ditaphone Sales Corp., 420 Lexington Ave., New York City.

## DIE-FILING MACHINES

Continental Machine Specialties, Inc., Minneapolis, Minn.

## DIE SINKING MACHINES—Automatic and Hand

Cincinnati (Ohio) Milling Mch. Co., The.

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

## DIEING MACHINES—Automatic

Henry & Wright Mfg. Co., The, Hartford, Conn.

## DIES—Cast Tool Steel

Forging & Casting Corp., The, Ferndale, Mich.

## DIES, JIGS, FIXTURES, etc.

Taft-Pelree Mfg. Co., The, Woonsocket, R. I.

## DIES—Pipe Threading

Landis Mch. Co., Inc., Waynesboro, Pa.

Murphy Machine & Tool Co., Detroit.

## DIES—Screw and Thread Cutting

Eastern Mach. Screw Corp., New Haven, Ct.

Geometric Tool Co., The, New Haven, Conn.

Greenfield (Mass.) Tap & Die Corp.

Jones & Lamson Mch. Co., Springfield, Vt.

Landis Mch. Co., Inc., Waynesboro, Pa.

Murphy Machine & Tool Co., Detroit.

National Acme Co., The, Cleveland.

## DIES—Self-Opening Adjustable

Eastern Mach. Screw Corp., New Haven, Ct.

Geometric Tool Co., The, New Haven, Conn.

Jones & Lamson Mch. Co., Springfield, Vt.

Landis Mch. Co., Inc., Waynesboro, Pa.

Murphy Machine & Tool Co., Detroit.

National Acme Co., The, Cleveland.

## DIES—Sheet Metal Working

Worcester (Mass.) Stamped Metal Co.

## DIES—Steel Letters and Stamps

Cunningham, M. E. Co., Pittsburgh.

Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

## DRAWN WORK—Metal—See Stampings or Drawings—Metal

## DRILL HEADS—Hydraulic

National Automatic Tool Co., Richmond, Ind.

## DRILL HEADS—Multiple

Baker Bros., Inc., Toledo, Ohio.

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

## DRILLING MACHINES—Bench

Leland-Gifford Co., Worcester, Mass.

## DRILLING MACHINES—Heavy Duty

Baker Bros., Inc., Toledo, Ohio.

## DRILLING MACHINES—Multiple Spin-

die

Baker Bros., Inc., Toledo, Ohio.

Henry & Wright Mfg. Co., The, Hartford, Conn.

National Automatic Tool Co., Richmond, Ind.

## DRILLING MACHINES—Multiple Spin-

die Adjustable

National Automatic Tool Co., Richmond, Ind.

## DRILLING MACHINES—Multiple Spin-

die Horizontal

Baker Bros., Inc., Toledo, Ohio.

National Automatic Tool Co., Richmond, Ind.

## DRILLING MACHINES—Portable Electric

Wodack Electric Tool Corp., Chicago.

## DRILLING MACHINES—Portable Pneumatic

Helwig Mfg. Co., St. Paul, Minn.

Ingersoll-Rand Co., 11 Broadway, New York City.

Warner & Swasey Co., The, Cleveland.

## DRILLING MACHINES—Radial

Cincinnati (Ohio) Bickford Tool Co., The.

## DRILLING MACHINES—Rock

Ingersoll-Rand Co., 11 Broadway, New York City.

## DRILLING MACHINES—Sensitive

Leland-Gifford Co., Worcester, Mass.

## DRILLING MACHINES—Upright

Baker Bros., Inc., Toledo, Ohio.

Cincinnati (Ohio) Bickford Tool Co., The.

## DRILLING MACHINES—Vertical

Baker Bros., Inc., Toledo, Ohio.

Cincinnati (Ohio) Bickford Tool Co., The.

## DRIVES—Gear

Farrel-Birmingham Co., Inc., Buffalo, N. Y.

Mesta Mch. Co., Pittsburgh.

## DRIVES—Single & Multiple V-Belts

Allis Chalmers Mfg. Co., Milwaukee.

## DROP FORGINGS—See Forgings—Drop, Iron or Steel

## DROP HAMMERS—See Hammers—Drop

DUST COLLECTORS

Abrasive Machine Tool Co., East Providence, R. I.

American Blower Corp., 6000 Russell St., Detroit.

American Foundry Equipment Co., The, 401 Ryker St., Mishawaka, Ind.

Blaw-Knox Co., Pittsburgh.

Pangborn Corporation, Hagerstown, Md.

Whiting Corp., Harvey, Ill.

## ECONOMIZERS

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

## ELECTRIC HEATING ELEMENTS

Global Div., The Carborundum Co., Niagara Falls, N. Y.

## ELECTRIC LIGHTING

General Electric Co., Cleveland.

General Electric Vapor Lamp Co., Hoboken, N. J.

## ELECTRIC WELDING—See Welding—Electric

## ELECTRICAL EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee.

General Electric Co., Schenectady, N. Y.

## ELECTRICAL MACHINERY—Second Hand. (See Clearing House Section)

## ELECTRICAL WIRES

Boehling's, John A., Sons Co., Trenton, N. J.

## ELECTRODES—Resistance Welding

Electroloy Co., Inc., 50 Church St., New York City.

## ELECTRODES—Welding, Coated

Electric Arc Cutting & Welding Co., The, Newark, N. J.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Lincoln Electric Co., The, Cleveland.

Maurath, Inc., 7400 Union Ave., Cleveland.

Una Welding, Inc., Cleveland, Ohio.

## ELECTROPLATING EQUIPMENT & SUPPLIES

Udylite Co., The, Detroit.

## ELEVATORS—Portable

Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

## ELEVATORS—Steam Hydraulic

Ridgway, Craig, & Son Co., Coatesville, Pa.

## EMERY WHEELS—See Grinding Wheels

## ENAMEL

Roxalin Flexible Lacquer Co., Inc., Elizabeth, New Jersey.

Sherwin-Williams Co., Cleveland.

## ENGINEERS & CONTRACTORS

Ferguson, H. K., Co., The, Cleveland.

ENGINEERS—Consulting and Industrial

Koppers Co., Pittsburgh.

## ENGINES—Diesel

Worthington Pump & Machinery Corp., Harrison, N. J.

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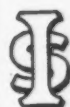
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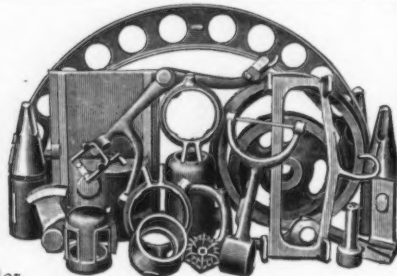
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## Products Index

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Fairbanks, Morse & Co., Chicago.  
Worthington Pump & Machinery Corp.,  
Harrison, N. J.

### ENGINES—Oil

Ingersoll-Rand Co., 11 Broadway, New  
York City.  
Worthington Pump & Machinery Corp.,  
Harrison, N. J.

### EYELET MACHINES

Manville, E. J., Mch. Co., Waterbury, Ct.  
Waterbury (Conn.) Farrel Foundry & Ma-  
chine Co., The.

### FACING CLAY

Carborundum Co., The, Perth Amboy, N.J.

### FACTORY & PLANT SITES

Zoll, Edward H., 196 Market St., Newark,  
N. J.

### FANS—Cooling

Perkins, B. F. & Son, Inc., Holyoke, Mass.

### FANS—Ventilating

American Blower Corp., 6000 Russell St.,  
Detroit.  
Bendix Products Corp., 413 Bendix Drive,  
South Bend, Ind.  
Clarage Fan Co., Kalamazoo, Mich.  
DeVilbiss Co., The, Toledo, Ohio.

### FEED WATER HEATERS AND PURI- FIERS

Harrisburg (Pa.) Steel Corp.

### FEEDS—Hydraulic, for Machines

American Engineering Co., Philadelphia.  
Oilgear Co., The, 1311 W. Bruce St., Mil-  
waukee.

### FELT—We mechanical

American Felt Co., 315 Fourth Ave., N.Y.C.

### FENCING—Wire

Pittsburgh (Pa.) Steel Co.

### FERROALLOYS

Climax Molybdenum Co., 500 Fifth Ave.,  
N. Y. C.  
Electro Metallurgical Sales Corp., 30 E.  
42nd St., N. Y. C.  
Ohio Ferro-Alloys Corp., Canton, Ohio.  
Pittsburgh Metallurgical Co., Inc., Niagara  
Falls, N. Y.  
Titanium Alloy Mfg. Co., The, Niagara  
Vanadium Corp. of America, 420 Lexington  
Ave., N. Y. C.

### FERROCHROME

Electro Metallurgical Sales Corp., 30 E.  
42nd St., N. Y. C.  
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Pittsburgh Metallurgical Co., Inc., Niag-  
ara Falls, N. Y.  
Samuel, Frank & Co., Inc., Philadelphia.  
Vanadium Corp. of America, 420 Lexing-  
ton Ave., N. Y. C.

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Pittsburgh Metallurgical Co., Inc., Niag-  
ara Falls, N. Y.  
Samuel, Frank & Co., Inc., Philadelphia.  
Vanadium Corp. of America, 420 Lexing-  
ton Ave., N. Y. C.

### FERROSILICON ALUMINUM

Vanadium Corp. of America, 420 Lexing-  
ton Ave., N. Y. C.

### FERROSPIEGELEISEN

New Jersey Zinc Co., The, 160 Front St.,  
N. Y. C.

### FERROTITANIUM

Titanium Alloys Mfg. Co., The, Niagara  
Falls, N. Y.  
Vanadium Corp. of America, 420 Lexing-  
ton Ave., N. Y. C.

### FERROVANADIUM

Electro Metallurgical Sales Corp., 30 E.  
42nd St., N. Y. C.  
Vanadium Corp. of America, 420 Lexing-  
ton Ave., N. Y. C.

### FILES & RASPS

Disston, Henry, & Sons, Inc., Philadelphia.  
Nicholson File Co., Providence, R. I.

### FILING MACHINES

Continental Machine Specialties, Inc.,  
Minneapolis, Minn.

### FILTER CLOTH—Asbestos

Johns-Manville Corp., 22 East 40th St.,  
New York City.

### FILTERS—Oil

National Acme Co., The, Cleveland.

### FILTERS—Pressure or Gravity

Scalfe, Wm. B. & Sons Co., Pittsburgh.

### FIRE BRICK—Insulating

Babcock & Wilcox Co., The, 85 Liberty  
St., New York City.  
Quigley Co., Inc., 56 West 45th St.,  
N. Y. C.

### FIRE CLAY

Carborundum Co., The, Perth Amboy, N. J.  
Illinois Clay Products Co., Joliet, Ill.

### FITTINGS—Brass, Pipe and Tube

Commonwealth Brass Corp., Detroit.

### FLANGES—Forged Steel

Harrisburg (Pa.) Steel Corp.  
Standard Steel Wks. Co., Burnham, Pa.

### FLANGING WORK—Carbon and Alloy

Worth Steel Co., Claymont, Del.

### FLEXIBLE SHAFT EQUIPMENT

Loreley Flexible Coupling Co., Chicago.  
Strand, N. A. & Co., Chicago.

### FLOODLIGHTS—Acetylene

Linde Air Prods. Co., The, 30 East 42nd  
St., N. Y. C.

### FLOOR ARMORING

Acme Steel Co., Chicago, Ill.

### FLOOR (CONCRETE) REPAIR MATE- RIALS

Flexrock Co., 892 N. Delaware Ave.,  
Phila., Pa.

### FLOOR PLATES—See Plates—Floor or Cellar Door

### FLOORING—Acid Proof

Nukem Products Corp., 68 Niagara St.,  
Buffalo, N. Y.

### FLOORING—Monolithic

Johns-Manville Corp., 22 East 40th St.,  
New York City.

### FLOORING—Open Steel

Blaw-Knox Co., Pittsburgh.  
Hendrick Mfg. Co., Carbondale, Pa.

### FLOORING—Steel

American Pressed Steel Co., Phila., Pa.

### FLUX—Welding

Linde Air Prods. Co., The, 30 E. 42nd  
St., N. Y. C.

### FORGINGS—Alloy Steel

National Forge & Ordnance Co., Irvine, Pa.

### FORGINGS—Aluminum

Aluminum Co. of America, Pittsburgh.

### FORGINGS—Brass, Bronze or Copper

American Brass Co., The, Waterbury, Conn.  
Commonwealth Brass Corp., Detroit.  
Revere Copper & Brass, Inc., 230 Park  
Ave., N. Y. C.

### FORGINGS—Coin Pressed

Rockford (Ill.) Drop Forge Co.

### FORGINGS—Drop, Iron or Steel

Atlas Drop Forge Co., Lansing, Mich.  
Canton (Ohio) Drop Forging & Mfg. Co.  
Carnegie-Illinois Steel Corp. (U. S. Steel  
Corp. Subsidiary), Pittsburgh & Chi-  
cago.  
Forging & Casting Corp., The, Ferndale,  
Mich.

Hartford (Conn.) Drop Forge Co., The.

Poor & Co., Canton Forge & Axle Wks.,  
Canton, Ohio

Rockford (Ill.) Drop Forge Co.

Storons Drop Forging Co., Springfield,  
Mass.

Williams, J. H. & Co., Buffalo, N. Y.

### FORGINGS—Hollow

Harrisburg (Pa.) Steel Corp.

National Forge & Ordnance Co., Irvine, Pa.

### FORGINGS—Hollow Bored

American Hollow Boring Co., 1912 Rasp-  
berry St., Erie, Pa.

### FORGINGS—Hydraulic Press, Iron or Steel

Atlas Drop Forge Co., Lansing, Mich.  
Bethlehem (Pa.) Steel Company.  
Mesta Mch. Co., Pittsburgh.

Midvale Co., The, Nicetown, Phila., Pa.

National Forge & Ordnance Co., Irvine, Pa.

Standard Steel Wks. Co., Burnham, Pa.

### FORGINGS—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave.,  
Midland, Mich.

### FORGINGS—Upset

Bethlehem (Pa.) Steel Company.

Rockford (Ill.) Drop Forge Co.

### FORMING MACHINES—Roll

Kane & Roach, Inc., Syracuse, New York.

### FOUNDRY EQUIPMENT & SUPPLIES

Jeffrey Mfg. Co., The, Columbus, Ohio.

Whiting Corp., Harvey, Ill.

### FURNACE ENGINEERS

Electric Furnace Co., The, Salem, Ohio.

Flinn & Dreffeln Co., Chicago.

Surface Combustion Corp., 2375 Dorr St.,  
Toledo.



# Products Index

## FURNACES—Annealing & Case Hardening

American Gas Furnace Co., Elizabeth, N. J.  
Electric Furnace Co., The, Salem, Ohio.  
Leeds & Northrup Co., Philadelphia.  
Surface Combustion Corp., 2375 Dorr St., Toledo.

## FURNACES—Billet or Ingot Heating

Flinn & Dreffeln Co., Chicago.  
Surface Combustion Corp., 2375 Dorr St., Toledo.

## FURNACES—Electric Induction

Ajax Electrothermic Corp., Trenton, N. J.

## FURNACES—Electric, Steel Melting

Ajax Electrothermic Corp., Trenton, N. J.  
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
General Electric Co., Schenectady, N. Y.  
Pittsburgh (Pa.) Lecomelt Furnace Corp.

## FURNACES—Enameling

Carborundum Co., The, Perth Amboy, N. J.  
Electric Furnace Co., The, Salem, Ohio.  
Surface Combustion Corp., 2375 Dorr St., Toledo.

## FURNACES—Forging

Electric Furnace Co., The, Salem, Ohio.  
Holcroft & Co., Detroit.  
Surface Combustion Corp., 2375 Dorr St., Toledo.

## FURNACES—Heat Treating, Automatic

Amer. Gas Furnace Co., Elizabeth, N. J.  
Electric Furnace Co., The, Salem, Ohio.  
Holcroft & Co., Detroit.

## FURNACES—Heat Treating, Cyanide of Lead

Chicago (Ill.) Flexible Shaft Co.  
Electric Furnace Co., The, Salem, Ohio.  
Surface Combustion Corp., 2375 Dorr St., Toledo.

## FURNACES—Heat Treating, Electric

Ajax Electrothermic Corp., Trenton, N. J.  
Electric Furnace Co., The, Salem, Ohio.  
General Electric Co., Schenectady, N. Y.  
Holcroft & Co., Detroit.

## FURNACES—Heat Treating, Oil or Gas

Chicago (Ill.) Flexible Shaft Co.  
Electric Furnace Co., The, Salem, Ohio.  
Holcroft & Co., Detroit.

## FURNACES—High Speed Steel

Ajax Electrothermic Corp., Trenton, N. J.

## FURNACES—Non-Ferrous Melting

Ajax Electrothermic Corp., Trenton, N. J.

## FURNACES—Pack Heating Sheets

Aetna-Standard Engineering Co., The, Youngstown, Ohio.  
Wean Engineering Co., Inc., The, Warren, Ohio.

## FURNACES—Rivet Heating, Electric

General Electric Co., Schenectady, N. Y.

## FURNACES—Wire, Annealing and Galvanizing

General Electric Co., Schenectady, N. Y.  
Surface Combustion Corp., 2375 Dorr St., Toledo.

## GAGE BLOCKS

Ford Motor Co. (Johansson Division), Dearborn, Mich.  
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

## GAGES—Dial

Starrett, L. S. Co., Athol, Mass.

## GAGES—Electric

Sheffield Gage Corp., Dayton, Ohio.

## GAGES—Plug and Snap

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

## GAGES—Thickness, for Rolling Mills

Haines Gage Co., The, Phila., Pa.

## GAGES—Thread Lead

Jones & Lamson Mfg. Co., Springfield, Vt.

## GALVANIZING

American Hot Dip Galvanizers Assn., Inc., Pittsburgh.

## GALVANIZING COMPOUNDS

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

## GALVANIZING PLANTS—For Sheets

Aetna-Standard Engineering Co., The, Youngstown, Ohio.

## GAS ANALYSIS RECORDERS

Leeds & Northrup Co., Philadelphia.

## GAS FOR INDUSTRIAL USES

American Gas Association, 420 Lexington Ave., N. Y. C.

## GAS PRODUCERS

Flinn & Dreffeln Co., Chicago.

## GOVERNORS—Air Compressor

Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

## GRABS—For Sheets

J-B Engineering Sales Co., 1738 Orange St., New Haven, Conn.

## GRATING—Flooring, Sidewalk, etc.—See Flooring—Open Steel

## GASKETS—Asbestos, Metal or Rubber

Garlock Packing Co., The, Palmyra, N. Y.  
Johns-Manville Corp., 22 East 40th St., New York City.

## GASKETS—Rubber

Goodrich, B. F., Co., The, Akron, Ohio.

## GEAR CUTTING

Earle Gear & Machine Co., Phila.  
Farrel-Birmingham Co., Inc., Buffalo, N.Y.  
Gleason Works, Rochester, N. Y.

## GEAR CUTTING MACHINES

Brown & Sharpe Mfg. Co., Prov., R. I.  
Farrel-Birmingham Co., Inc., Buffalo, N.Y.  
Gleason Works, Rochester, N. Y.

## GEAR DRIVES—Herringbone

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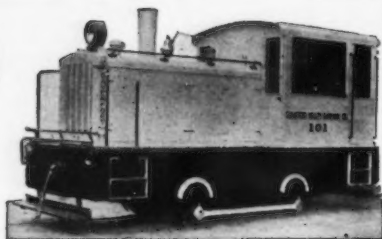
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# Products Index

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Gulf Oil Corp., Gulf Refining Co., Pittsburg, Mo.  
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Calif.  
St. Louis, 50 W. 50th St., N. Y. C.  
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.  
Standard Oil Co. (Indiana), Chicago.  
Sun Oil Co., Philadelphia.  
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

### GRILLES—Metal Cane

Diamond Mfg. Co., Wyoming, Pa.

### GRILLES—Perforated Metal

Erdle Perforating Co., Rochester, N. Y.  
Harrington & King Perforated Co., Chicago.

### GRINDING AND POLISHING MACHINES

Excelsior Tool & Mch. Co., E. Et. Louis, Ill.  
Hammond Machinery Builders, Inc., Kalamazoo, Mich.  
Norton Co., Worcester, Mass.  
Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.

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Cincinnati (Ohio) Grinders Incorporated.

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Bryant Chucking Grinder Co., Springfield, Vt.

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Cincinnati (Ohio) Milling Mch. Co., The Gallmeyer & Livingston Co., Grand Rapids, Mich.

### GRINDING MACHINES—Cylindrical

Heald Mch. Co., Worcester, Mass.  
Hutto Machine Division, Carborundum Co., Detroit.

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Brown & Sharpe Mfg. Co., Providence, R. I.  
Cincinnati (Ohio) Grinders Incorporated.  
Landis Tool Co., Waynesboro, Pa.  
Norton Co., Worcester, Mass.

### GRINDING MACHINES—Die

Landis Mch. Co., Inc., Waynesboro, Pa.

### GRINDING MACHINES—Drill

Gallmeyer & Livingston Co., Grand Rapids, Mich.

### GRINDING MACHINES—Gear & Worm

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

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Bryant Chucking Grinder Co., Springfield, Vt.  
Greenfield (Mass.) Tap & Die Corp.  
Heald Mch. Co., Worcester, Mass.  
Hutto Machine Division, Carborundum Co., Detroit.

### GRINDING MACHINES—Internal Centerless

Heald Mch. Co., Worcester, Mass.

### GRINDING MACHINES—Internal Multiple Spindle

Baird Mch. Co., The Bridgeport, Conn.

### GRINDING MACHINES—Portable Electric

Wodack Electrical Tool Corp., Chicago.

### GRINDING MACHINES—Portable Flexible Shaft

Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

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Ingersoll-Rand Co., 11 Broadway, New York City.

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Farrel-Birmingham Co., Inc., Ansonia, Conn.

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Heller Machine Co., 114 Liberty St., N. Y. C.

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Vonnegut Moulder Corp., 1807 Madison Ave., Indianapolis, Ind.

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Blanchard Machine Co., The, Cambridge, Mass.

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Norton Co., Worcester, Mass.

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Blanchard Machine Co., The, Cambridge, Mass.  
Carborundum Co., The, Niagara Falls, N. Y.  
Macklin Co., Jackson, Mich.  
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.  
Norton Co., Worcester, Mass.

### GRINDING WHEELS—Segment

Blanchard Machine Co., The, Cambridge, Mass.

### GRIT—Steel

Pittsburgh (Pa.) Crushed Steel Co.

### HACK SAW BLADES—See Saws—Hack Saw Blades

### HACK SAW MACHINES

Armstrong-Blum Mfg. Co., Chicago.  
Peerless Mch. Co., Racine, Wis.

### HAMMER BOARDS

Irwin, H. G., Lumber Co., 1129 State St., Erie, Pa.

### HAMMERS—Drop

Erie (Pa.) Foundry Co.  
Morgan Engineering Co., The, Alliance, O.  
Standard Machinery Co., Providence, R. I.

### HAMMERS—Helve

Bradley, C. C., & Son, Inc., Syracuse, N. Y.

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Ingersoll-Rand Co., 11 Broadway, New York City.

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Chicago (Ill.) Rawhide Mfg. Co., 1306 Elson Ave.

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Erie (Pa.) Foundry Co.  
Morgan Engineering Co., The, Alliance, O.

### HANGERS—Ball Bearing

S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

### HANGERS—Roller Bearing

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

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Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

### HEADING MACHINES

Manville, E. J., Mch. Co., Waterbury, Ct.  
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

### HEADS—Spun and Pressed

Central Iron & Steel Co., Harrisburg, Pa.  
Worth Steel Co., Claymont, Del.

### HEADS—Steel—Flanged & Dished

Central Iron & Steel Co., Harrisburg, Pa.

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Globe Div., The Carborundum Co., Niagara Falls, N. Y.

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Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.

Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.  
General Machine Wks., York, Pa.  
Gibson, Wm. D. Co., Div. of Associated Spring Corp., Chicago.

Holden, A. F., Co., New Haven, Conn.  
Parish Pressed Steel Co., Reading, Pa.

### HEAT TREATING COMPOUNDS

Holden, A. F., Co., New Haven, Conn.

### HEAT TREATING EQUIPMENT—Air Draw

Holden, A. F., Co., New Haven, Conn.

Maehler, Paul Co., The, Chicago.

Surface Combustion Corp., 2375 Dorst St., Toledo.

### HEATING RESISTANCE—Non-Metallic

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Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

Detroit (Mich.) Hoist & Mch. Co.  
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

Northern Engineering Works, Detroit.  
Ridgway, Craig & Son Co., Coatesville, Pa.

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Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

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American Engineering Co., Philadelphia.  
Detroit (Mich.) Hoist & Mch. Co.  
Euclid Crane & Hoist Co., The, Euclid, O.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.

Northern Engineering Works, Detroit, Mich.  
Philadelphia (Pa.) Gear Works.  
Robbins & Myers, Inc., Springfield, Ohio.  
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

Shepard Niles Crane & Hoist Corp., Mont-tour Falls, N. Y.  
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.

Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

# Products Index

**HOISTS—Electric Traveling**  
American Monorail Co., The, Cleveland.  
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.  
Euclid Crane & Hoist Co., The, Euclid, O.  
Northern Engineering Works, Detroit.  
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.

**HOISTS—Monorail**  
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.  
Euclid Crane & Hoist Co., The, Euclid, O.  
Northern Engineering Works, Detroit.  
Shaw-Box Crane & Hoist Co., Inc., 402 Broadway, Muskegon, Mich.  
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

**HOISTS—Scraper**  
Sullivan Machinery Co., Claremont, N. H.

**HOSE—Flexible Metallic**  
American Brass Co., The, Waterbury, Conn.

**HOSE—Rubber**  
Goodrich, B. F., Co., The, Akron, Ohio.  
Goodyear Tire & Rubber Co., Akron, Ohio.  
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

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Wood, R. D. & Co., Philadelphia.

**HYDRAULIC MACHINERY**  
Baldwin-Southwark Corp., Southwark Div., Philadelphia.  
Elmes, Chas. F., Engng. Wks., Chicago.  
Hydraulik GmbH, Duisburg, Germany.  
Morgan Engineering Co., The, Alliance, O.  
Wood, R. D. & Co., Philadelphia.

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Shenango Furnace Co., Pittsburgh.  
Shenango-Penn Mold Co., Pittsburgh.  
Snyder, W. P. & Co., Pittsburgh.  
Valley Mold & Iron Corp., Hubbard, Ohio.

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Aluminum Co. of America, Pittsburgh.  
Selleman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

**INGOTS—Phosphor Bronze**  
Phosphor Bronze Smelting Co., The, Phila.

**INHIBITORS**  
American Chemical Paint Co., Ambler, Pa.  
Du Pont de Nemours, E. I., & Co., Inc.  
Grasselli Chemicals Dept., Wilmington, Del.

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Leeds & Northrup Co., Philadelphia.

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Newport (Ky.) Rolling Mill Co., The.

**IRON—Rustless**  
Ludlum Steel Co., Watervliet, N. Y.

**JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)**

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Sherwin-Williams Co., Cleveland.

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Quigley Co., Inc., 56 West 45th St., N. Y. C.

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General Electric Co., Cleveland.

**LAMPS—Mercury Vapor**  
General Electric Vapor Lamp Co., Hoboken, N. J.

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Cincinnati (Ohio) Grinders Incorporated.

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Baird Mch. Co., The, Bridgeport, Conn.  
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Gisholt Machine Co., Madison, Wis.  
Goss & De Leeuw Mch. Co., New Britain, Conn.  
Jones & Lamson Mch. Co., Springfield, Vt.  
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Monarch Mch. Tool Co., The, Sidney, O.

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Bullard Co., The, Bridgeport, Conn.  
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Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.  
Rivett Lathe & Grinder, Inc., Boston, Mass.

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Warner & Swasey Co., The, Cleveland.

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Jones & Lamson Mch. Co., Springfield, Vt.  
Warner & Swasey Co., The, Cleveland.

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Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

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**LOCOMOTIVES—Industrial**  
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Jeffrey Mfg. Co., The, Columbus, Ohio.

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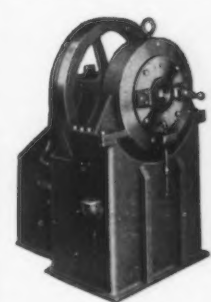
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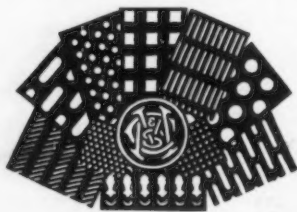
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 Socony-Vacuum Oil Co., Inc., 26 Broad-  
 way, N. Y. C.  
 Sun Oil Co., Philadelphia.  
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**MACHINE GUARD MATERIALS**  
 Erdle Perforating Co., Rochester, N. Y.

**MACHINE WORK**  
 General Machine Works, York, Pa.  
 Houde Engineering Corp., Buffalo, N. Y.  
 National Rubber Machinery Co., Clifton  
 Div., Clifton, N. J.  
 Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

**MACHINERY DEALERS—Second-Hand.**  
 (See Clearing House Section)

**MACHINISTS' SMALL TOOLS**  
 Starrett, L. S., Co., Athol, Mass.

**MAGNESITE—Brick or Dead Burnt**  
 Carborundum Co., The, Perth Amboy, N. J.

**MAGNESIUM**  
 Dow Chemical Co., The, 921 Jefferson Ave.,  
 Midland, Mich.

**MAGNETS—Lifting**  
 Cutler-Hammer, Inc., Milwaukee.  
 Electric Controller & Mfg. Co., The, Cleve.  
 Ohio Electric Mfg. Co., The, 5908 Maurice  
 Ave., Cleveland.

**MALLETS—Rawhide**  
 Chicago (Ill.) Rawhide Mfg. Co., The,  
 1306 Elston Ave.

**MANDRELS—Expanding**  
 Nicholson, W. H., & Co., 165 Oregon St.,  
 Wilkes-Barre, Pa.

**MANGANESE METAL AND ALLOYS**  
 Electro Metallurgical Sales Corp., 30 East  
 42nd St., N. Y. C.

**MANHOLE FITTINGS AND SADDLES**  
 Worth Steel Co., Claymont, Del.

**MANIFOLDS—Oxygen & Acetylene**  
 Air Reduction Sales Co., 60 East 42nd  
 St., N. Y. C.  
 Linde Air Prods. Co., The, 30 East 42nd  
 St., N. Y. C.

**MARKING MACHINES**  
 Noble & Westbrook Mfg. Co., The, East  
 Hartford, Conn.

**METAL SPECIALTIES**  
 Crosby Co., The, Buffalo, N. Y.  
 Toledo (Ohio) Stamping & Mfg. Co.  
 Torrington (Conn.) Company.  
 Truscon Steel Co., Pressed Steel Div.,  
 Cleveland.  
 Whitehead Stamping Co., 1669 W. Lafay-  
 ette Blvd., Detroit, Mich.  
 Worcester (Mass.) Stamped Metal Co.

**METERS—Flow**  
 Leeds & Northrup Co., Philadelphia.

**METERS—Water & Oil**  
 Worthington Pump & Machinery Corp.,  
 Harrison, N. J.

**MICA SCHIST**  
 Edge Hill Silica Rock Co., New Bruns-  
 wick, New Jersey.

**MICROMETERS**  
 Starrett, L. S., Co., Athol, Mass.

**MICROMETERS—Automatic, for Rolling  
 Mills**  
 Haines Gauge Co., The, Phila., Pa.

**MILLING MACHINES—Automatic**  
 Brown & Sharpe Mfg. Co., Prov., R. I.  
 Cincinnati (Ohio) Milling Mch. Co., The.

**MILLING MACHINES—Horizontal**  
 Brown & Sharpe Mfg. Co., Prov., R. I.  
 Cincinnati (Ohio) Milling Mch. Co., The.

**MILLING MACHINES—Planer Type**  
 Cincinnati (Ohio) Planer Co.

**MILLING MACHINES—Second-Hand.**  
 (See Clearing House Section)

**MILLING MACHINES—Vertical**  
 Brown & Sharpe Mfg. Co., Prov., R. I.  
 Cincinnati (Ohio) Milling Mch. Co., The.

**MOLDING MACHINES**  
 Tabor Mfg. Co., Phila., Pa.

**MOLYBDENUM**  
 Climax Molybdenum Co., 500 Fifth Ave.,  
 N. Y. C.

**MONEL METAL**  
 International Nickel Co., Inc., The, 67  
 Wall St., N. Y. C.

**MONORAIL SYSTEMS—Hand & Electric**  
 American Monorail Co., The, Cleveland.  
 Cleveland Tramrail Div. of The Cleveland  
 Crane & Engng. Co., Wickliffe, Ohio.

**MOTORS—Electric**  
 Allis-Chalmers Mfg. Co., Milwaukee.  
 Century Electric Co., St. Louis, Mo.  
 Fairbanks, Morse & Co., Chicago  
 General Electric Co., Schenectady, N. Y.  
 Harnischfeger Corp., 4401 W. National  
 Ave., Milwaukee.  
 Lincoln Electric Co., Cleveland.  
 Reliance Electric & Engineering Co.,  
 Cleveland.  
 Westinghouse Elec. & Mfg. Co., E. 17th.

**MOTORS—Electric, Second-Hand.** (See  
 Clearing House Section)

**NAILS—Wire**  
 American Steel & Wire Co. (U. S. Steel  
 Corp. Subsidiary), Chicago.  
 Columbia Steel Co. (U. S. Steel Corp.  
 Subsidiary), San Francisco, Calif.  
 Hassall, John, Inc., Clay & Oakland Sts.,  
 Bklyn., N. Y.  
 Pittsburgh (Pa.) Steel Co.  
 Wickwire Brothers, Cortland, N. Y.  
 Youngstown (Ohio) Sheet & Tube Co., The.

**NICKEL**  
 International Nickel Co., Inc., The, 67  
 Wall St., N. Y. C.

**NICKEL ANODES—Rolled or Cast**  
 Riverside (N. J.) Metal Co.  
 Seymour (Conn.) Mfg. Co.

**NICKEL SILVER**  
 Riverside (N. J.) Metal Co.  
 Seymour (Conn.) Mfg. Co.

**NITROGEN**  
 Air Reduction Sales Co., 60 East 42nd  
 St., N. Y. C.

**NOZZLES—Sand Blasting**  
 Norton Co., Worcester, Mass.

**NUMBERING MACHINES—For Metal**  
 Noble & Westbrook Mfg. Co., The, East  
 Hartford, Ct.

**NUT MACHINERY—Automatic Cold  
 Pressed**  
 Waterbury (Conn.) Farrel Foundry & Ma-  
 chine Co., The.

**NUTS—Acorn**  
 Republic Steel Corp., Upson Nut Div.,  
 Cleveland, O.

**NUTS—Castellated**  
 National Acme Co., The, Cleveland.  
 Republic Steel Corp., Upson Nut Div.,  
 Cleveland, O.

**NUTS—Cold Punched**  
 Republic Steel Corp., Upson Nut Div.,  
 Cleveland, O.

**NUTS—Hot Pressed**  
 Republic Steel Corp., Upson Nut Div.,  
 Cleveland, O.

**NUTS—Lock**  
 Standard Pressed Steel Co., Jenkintown,  
 Pa.

**NUTS—Machine Screw**  
 Blake & Johnson Co., The, Waterville, Ct.

**NUTS—Semi-Finished**  
 Cleveland (Ohio) Cap Screw Co., The.  
 Republic Steel Corp., Upson Nut Div.,  
 Cleveland, O.

**NUTS—Thumb Malleable**  
 Republic Steel Corp., Upson Nut Div.,  
 Cleveland, O.

**NUTS—Wing**  
 Parker-Kalon Corp., 196 Varick St.,  
 N. Y. C.

**OIL & GREASE SEALS**  
 Chicago (Ill.) Rawhide Mfg. Co., The,  
 1306 Elston Ave.

**OIL—Fuel, Low Sulphur**  
 Bennett Oil Co., Inc., 366 Madison Ave.,  
 New York City.

**OIL RETAINERS**  
 Chicago (Ill.) Rawhide Mfg. Co., The,  
 1306 Elston Ave.

**OIL STONES**  
 Carborundum Co., The, Niagara Falls,  
 N. Y.

**OILS—Cutting**  
 Shell's Industrial Lubricants Div., Shell  
 Bldg., San Francisco; Shell Bldg.,  
 St. Louis, & 50 W. 50th St., N. Y. C.  
 Socony-Vacuum Oil Co., Inc., 26 Broad-  
 way, N. Y. C.



# Products Index

Standard Oil Co. (Indiana), Chicago, Ill.  
Sun Oil Co., Philadelphia.  
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

**OILS—Fuel**  
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.  
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.  
Standard Oil Co. (Indiana), Chicago, Ill.  
Sun Oil Co., Philadelphia.  
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

**OILS—Lubricating**  
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.  
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 59 W. 50th St., N. Y. C.  
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.  
Standard Oil Co. (Indiana), Chicago.  
Texas Company, The, 135 East 42nd St., N. Y. C.  
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

**OILS—Soluble—See Oils—Cutting**

**ORES—Iron**  
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.  
Hanna Furnace Corp., The, Detroit, Mich.  
Pickands Mather & Co., Cleveland.  
Shenango Furnace Co., Pittsburgh.  
Snyder, W. P., & Co., Pittsburgh.

**OVENS—Coke and By-Product Recovery**  
Koppers Co., Pittsburgh.

**OVENS—Core and Mold**  
Herrington & Randall, Inc., Detroit.  
Holcroft & Co., Detroit.

**OVENS—Cross Regenerative**  
Koppers Co., Pittsburgh.

**OVENS—Enameling and Japanning**  
Carborundum Co., The, Perth Amboy, N. J.  
Herrington & Randall, Inc., Detroit.  
Machler, Paul Co., The, Chicago.  
Surface Combustion Corp., 2375 Dorr St., Toledo.

**OXY-ACETYLENE—Shape-Cutting Machines**  
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.  
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

**OXYGEN**  
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.  
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

**PACKING—Felt**  
American Felt Co., 315 Fourth Ave., N. Y. C.

**PACKING—Hydraulic**  
Rhoads, J. E. & Sons, Philadelphia.

**PACKING—Leather**  
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.  
Rhoads, J. E. & Sons, Philadelphia.

**PACKING—Metallic**  
Garlock Packing Co., The, Palmyra, N. Y.

**PACKING—Rubber**  
Goodrich, B. F., Co., The, Akron, Ohio.  
Goodyear Tire & Rubber Co., Akron, Ohio.  
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

**PACKING—Sheet, Asbestos or Rubber**  
Garlock Packing Co., The, Palmyra, N. Y.  
Johns-Manville Corp., 22 East 40th St., New York City.

**PAINT**  
Sherwin-Williams Co., Cleveland.

**PERFORATED METAL**  
Chicago Perforating Co., 2440 W 24th Place, Chicago, Ill.  
Diamond Mfg. Co., Wyoming, Pa.  
Erdle Perforating Co., Rochester, N. Y.  
Harrington & King Perforating Co., Chicago.  
Hendrick Mfg. Co., Carbondale, Pa.  
Mundt, Chas. & Sons, 59 Fairmount Ave., Jersey City, N. J.  
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

**PHOSPHOR—Copper**  
Phosphor Bronze Smelting Co., The, Phila.

**PICKLING COMPOUNDS**  
American Chemical Paint Co., Ambler, Pa.

**PICKLING MACHINES**  
Aetna-Standard Engineering Co., The, Youngstown, Ohio.  
Mesta Mch. Co., Pittsburgh.

**PICKLING TANK LININGS**  
Cellcote Co., The, Cleveland.

**PICKLING TANK STEAM JETS**  
Dietzel Lead Burning Co., Pittsburgh.  
Durion Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

**PIG IRON**  
Bethlehem (Pa.) Steel Co.  
Brooke, E. & Co., Iron Co., Birdsboro, Pa.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.  
Hanna Furnace Corp., The, Detroit, Mich.  
Pickands Mather & Co., Cleveland.  
Republic Steel Corp., Cleveland, Ohio.  
Shenango Furnace Co., Pittsburgh.  
Shenango-Penn Mold Co., Pittsburgh.

Superior Charcoal Iron Co., Grand Rapids, Mich.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

**PIG IRON—Charcoal**  
Superior Charcoal Iron Co., Grand Rapids, Mich.

**PILING—Steel Pipe**  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

**PILING—Steel Sheet**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Jones & Laughlin Steel Corp., Pittsburgh.

**PINIONS—Rolling Mill**  
Mesta Mch. Co., Pittsburgh.

**PINIONS—Wire and Rod**  
Rathbone, A. R. & J., Palmer, Mass.

**PINS—Cotter**  
Lamson & Sessions Co., The, Cleveland.

**PIPE—Cast Iron, B. & S. and Flanged**  
Wood, R. D. & Co., Philadelphia.

**PIPE—Hammer Welded**  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

**PIPE—New and Second-Hand**  
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.  
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.  
Greenpoint Iron & Pipe Co., Inc., Stag & Bogart Sts., Bklyn., N. Y.

**PIPE—Seamless Brass or Copper**  
American Brass Co., The, Waterbury, Conn.  
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

**PIPE—Spiral Welded**  
American Rolling Mill Co., Middletown, O.  
Crane Co., Chicago.

**PIPE—Standard, Black and Galvanized**  
Bethlehem (Pa.) Steel Co.  
Jones & Laughlin Steel Corp., Pittsburgh.  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Republic Steel Corp., Cleveland, Ohio.  
Youngstown (Ohio) Sheet & Tube Co., The.

**PIPE—Welded, Electric**  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Republic Steel Corp., Cleveland, Ohio.

**PIPE COVERING—Asbestos**  
Johns-Manville Corp., 22 East 40th St., New York City.

**PIPE FITTINGS**  
Crane Co., Chicago.

Jarecki Mfg. Co., Erie, Pa.

**PIPE THREADING & CUTTING MACHINES**  
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

Curtis & Curtis Co., The, Bridgeport, Conn.

Jarecki Mfg. Co., Erie, Pa.  
Landis, Mach. Co., Inc., Waynesboro, Pa.  
Merrell Mfg. Co., Toledo.

Murphy Machine & Tool Co., Detroit.

Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

**PLANERS**  
Cincinnati (Ohio) Planer Co.

**TIMING MACHINES—Second Hand.**  
(See Clearing House Section)

**PLASTICS—Laminated**  
Bakelite Corp., 247 Park Ave., N. Y. C.

**PLASTICS—Laminated or Molded**  
Phenolic

Richardson Co., The, Melrose Park, Ill.

**PLASTICS—Molded**  
Bakelite Corp., 247 Park Ave., N. Y. C.

**PLASTICS—Synthetic**  
Bakelite Corp., 247 Park Ave., N. Y. C.

**PLASTER'S CLEANING COMPOUND**  
American Chemical Paint Co., Ambler, Pa.

**PLATES—Floor or Ceiling**  
Alan Wood Steel Co., Conshohocken, Pa.  
American Pressed Steel Co., Phila., Pa.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Central Iron & Steel Co., Harrisburg, Pa.  
Inland Steel Co., Chicago.

**PLATES—Iron or Steel**  
Alan Wood Steel Co., Conshohocken, Pa.

American Pressed Steel Co., Phila., Pa.

American Rolling Mill Co., Middletown, O.

Bethlehem (Pa.) Steel Company.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Central Iron & Steel Co., Harrisburg, Pa.

Granite City (Ill.) Steel Co.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Ryerson, Joseph T. & Son, Inc., Chicago.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Weirton (W. Va.) Steel Co.

Worth Steel Co., Claymont, Del.

Youngstown (Ohio) Sheet & Tube Co., The.

**PLATES—Rolled Manganese**  
Manganese Steel Forge Co., Phila., Pa.

**PLATFORMS—Skid**  
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

**PLUGS—Core Hole**  
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

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Ambler, Pa.

# Products Index

**POLISHING & BUFFING MACHINES**—Automatic  
Hammond Machinery Builders, Inc., Kalamazoo, Mich.  
Packer Machine Co., Meriden, Conn.

**POLISHING MACHINES**  
Continental Machine Specialties, Inc., Minneapolis, Minn.  
Packer Machine Co., Meriden, Conn.

**POLISHING MACHINES**—Bar  
Medart Co., The, St. Louis, Mo.

**POWER UNITS**—Rotary  
New Departure Div., General Motors Corp., Bristol, Conn.

**PRECIPITATORS**—Electrostatic Dust  
Pangborn Corporation, Hagerstown, Md.

**PRESS FEEDS**—Automatic  
Littell, F. J., Mch. Co., Chicago.

**PRESSED METAL PARTS**  
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.  
Crosby Co., The, Buffalo, N. Y.  
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.  
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

**PRESSED STEEL PARTS**  
Crosby Co., The, Buffalo, N. Y.  
Lansing (Mich.) Stamping Co., So. Penn Ave. Parish Pressed Steel Co., Reading, Pa.  
Toledo (Ohio) Stamping & Mfg. Co.  
Trucon Steel Co., Pressed Steel Div., Cleveland.

**PRESSES**—Automatic  
Henry & Wright Mfg. Co., The, Hartford, Conn.  
Niagara Mch. & Tool Wks., Buffalo, N. Y.  
V & O Press Co., Hudson, N. Y.

**PRESSES**—Baling  
Galland-Henning Mfg. Co., Milwaukee.

**PRESSES**—Baling, Hydraulic  
Baldwin-Southwark Corp., Southwark Div., Philadelphia.  
Galland-Henning Mfg. Co., Milwaukee.

**PRESSES**—Coining  
Zeh & Hahnemann Co., Newark, N. J.

**PRESSES**—Drop—See Hammers—Drop

**PRESSES**—Foot  
Baird Mch. Co., The, Bridgeport, Conn.  
Niagara Machine & Tool Works, Buffalo, N. Y.  
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

**PRESSES**—Forging  
Hydraulik GmbH, Duisburg, Germany.  
Mesta Mch. Co., Pittsburgh.  
Morgan Engineering Co., The, Alliance, O.

**PRESSES**—Forming and Bending  
Cincinnati (Ohio) Shaper Co., The.  
Dreis & Krump Mfg. Co., Chicago.  
Niagara Mch. & Tool Wks., Buffalo, N. Y.

**PRESSES**—Friction Screw  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
Zeh & Hahnemann Co., Newark, N. J.

**PRESSES**—Hydraulic  
Baldwin-Southwark Corp., Southwark Div., Philadelphia.  
Elmes, Chas. F., Engng. Wks., Chicago.  
Farrel-Birmingham Co., Inc., Ansonia, Conn.  
Hammon Mfg. Co., Chicago.  
Hydraulik GmbH, Duisburg, Germany.  
Mesta Mch. Co., Pittsburgh.  
Morgan Engineering Co., The, Alliance, O.  
Oilgear Co., The, 1311 W. Bruce, Milwaukee.  
Wood, R. D., & Co., Philadelphia.

**PRESSES**—Power  
Baird Mch. Co., The, Bridgeport, Conn.  
Cincinnati (Ohio) Shaper Co., The.  
Farrel-Birmingham Co., Inc., Ansonia, Conn.  
Hyman, Joseph, & Sons, Phila.  
Manville, E. J., Mch. Co., Waterbury, Ct.  
New Albany (Ind.) Mch. Mfg. Co.  
Niagara Machine & Tool Wks., Buffalo, N. Y.  
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
Standard Machinery Co., Providence, R. I.  
V & O Press Co., Hudson, N. Y.  
Waterbury (Conn.) Farrel Fdry. & Mch. Co., The.  
Zeh & Hahnemann Co., Newark, N. J.

**PRESSES**—Trimming  
Erie (Pa.) Foundry Co.  
Niagara Mch. & Tool Wks., Buffalo, N. Y.

**PULLEYS**—Iron, Solid & Split  
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.  
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

**PULLEYS**—Magnetic  
Cutler-Hammer, Inc., Milwaukee.

**PULLEYS**—Vacuum Cup  
Vacuum Cup Metal Pulley Co., Inc., Detroit, Mich.

**PULVERIZERS**  
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

Jeffrey Mfg. Co., The, Columbus, Ohio.  
Whitling Corp., Harvey, Ill.

**PUMPS**—Acid Resisting  
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

**PUMPS**—Boiler Feed  
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

**PUMPS**—Centrifugal  
Fairbanks, Morse & Co., Chicago.  
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.  
Pennsylvania Pump & Compressor Co., Easton, Pa.  
Rumsey Pump Corp., Seneca Falls, N. Y.  
Ruthman Machinery Co., Cincinnati.  
Tomkins-Johnson Co., The, Jackson, Mich.  
Worthington Pump & Machinery Corp., Harrison, N. J.

**PUMPS**—Coolant  
Ruthman Machinery Co., Cincinnati.

**PUMPS**—Electric  
Fairbanks, Morse & Co., Chicago.

**PUMPS**—Hydraulic  
American Engineering Co., Philadelphia.  
Elmes, Chas. F., Engng. Wks., Chicago.  
Fairbanks, Morse & Co., Chicago.  
Rumsey Pump Corp., Seneca Falls, N. Y.  
Worthington Pump & Machinery Corp., Harrison, N. J.

**PUMPS**—Power  
Fairbanks, Morse & Co., Chicago.  
Worthington Pump & Machinery Corp., Harrison, N. J.

**PUMPS**—Rotary Positive, Centrifugal & Turbine  
Crane Co., Chicago.

**PUMPS**—Steam  
Fairbanks, Morse & Co., Chicago.  
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.  
Worthington Pump & Machinery Corp., Harrison, N. J.

**PUMPS**—Vacuum  
Pennsylvania Pump & Compressor Co., Easton, Pa.  
Worthington Pump & Machinery Corp., Harrison, N. J.

**PUNCHES & DIES**  
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

**PUNCHING AND SHEARING MACHINES**  
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.  
Bertsch & Co., Cambridge City, Ind.  
Cincinnati (Ohio) Shaper Co., The.  
Excelsior Tool & Mach. Co., E. St. Louis, Ill.  
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.  
Niagara Machine & Tools Works, Buffalo, N. Y.  
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
Thomas Spacing Mch., Pittsburgh.

**PYROMETERS**—Indicating  
Hoskins Mfg. Co., Detroit, Mich.  
Leeds & Northrup Co., Philadelphia.

**RAIL SPlice BARS**  
Ames, W., & Co., Jersey City, N. J.

**RAILS**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Foster, L. B., Co., Inc., Pittsburgh.  
Frank, M. K., 480 Lexington Ave., N. Y. C.  
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

**RAILS**—Relaying  
Hyman-Michaels Co., Chicago.  
Sherwood, E. C., 50 Church St., N. Y. C.

**RAILWAY EQUIPMENT & SUPPLIES**  
Fairbanks, Morse & Co., Chicago.

**REAMERS**  
Cleveland (Ohio) Twist Drill Co., The.  
Greenfield (Mass.) Tap & Die Corp.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.  
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

**REAMING MACHINES**  
Blanchard Machine Co., The, Cambridge, Mass.

**REELS**—For Coil Stock  
Littell, F. J., Mch. Co., Chicago.

**REFRACATORIES**  
Babcock & Wilcox Co., The, 85 Liberty St., New York City.  
Cleveland (Ohio) Quarries Co., The.  
Illinois Clay Products Co., Joliet, Ill.  
McClintock, Glenn R., & Co., Pittsburgh.

**REGULATORS**—Compressed Gas  
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.  
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

**REINFORCEMENT FABRIC**—Concrete  
Pittsburgh (Pa.) Steel Co.  
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.



# Products Index

## RINGS—Iron or Steel

Midvale Co., The, Nicetown, Phila., Pa.  
Standard Steel Wks. Co., Burnham, Pa.

## RINGS—Welded

American Welding & Mfg. Co., Warren, O.

## RIVET MAKING MACHINERY

Manville, E. J., Mch. Co., Waterbury, Ct.  
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

## RIVET SETS

Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

## RIVETING MACHINES

Hannifin Mfg. Co., Chicago.  
Shuster, F. B., Co., The, New Haven, Ct.

## RIVETS

Blake & Johnson Co., The, Waterville, Ct.  
Clark Bros. Bolt Co., Milldale, Conn.  
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.  
Progressive Mfg. Co., Torrington, Conn.  
Russell, Burdiss & Ward Bolt & Nut Co., Port Chester, N. Y.

## RODS—Aluminum

Aluminum Co. of America, Pittsburgh.

## RODS—Brass

American Brass Co., The, Waterbury, Conn.  
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

## RODS—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

## RODS—Nickel Silver

American Brass Co., The, Waterbury, Conn.  
Riverside (N. J.) Metal Co.  
Seymour (Conn.) Mfg. Co.

## RODS—Phosphor Bronze

American Brass Co., The, Waterbury, Conn.  
Phosphor Bronze Smelting Co., The, Phila.  
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.  
Riverside (N. J.) Metal Co.  
Seymour (Conn.) Mfg. Co.

## RODS—Welding

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.  
American Brass Co., The, Waterbury, Conn.  
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.  
Electric Arc Cutting & Welding Co., The, Newark, N. J.  
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.  
Lincoln Electric Co., The, Cleveland.  
Linde Air Frods. Co., The, 30 East 42nd St., N. Y. C.  
Pittsburgh (Pa.) Steel Co.  
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.  
Una Welding, Inc., Cleveland, Ohio.  
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

## RODS—Wire

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.  
Bethlehem (Pa.) Steel Co.  
Jones & Laughlin Steel Corp., Pittsburgh.  
Pittsburgh (Pa.) Steel Co.  
Wickwire Brothers, Cortland, N. Y.  
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.  
Youngstown (Ohio) Sheet & Tube Co., The.

## ROLLING MACHINERY—Cold Rolling

Cold Metal Process Co., The, Youngstown, Ohio.  
Lewis Foundry & Mch. Co., Pittsburgh.  
United Engineering & Fdry. Co., Pgh.

## ROLLING MACHINERY—Sheet Metal

Lewis Foundry & Mch. Co., Pittsburgh.

## ROLLING MILL MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, Ohio.  
Cold Metal Process Co., The, Youngstown, Ohio.  
Farrel-Birmingham Co., Inc., Ansonia, Ct.  
Hyde Park (Pa.) Fdry. & Mch. Co.  
Lewis Foundry & Mch. Co., Pittsburgh.  
Mesta Mch. Co., Pittsburgh.  
Morgan Construction Co., Worcester, Mass.  
Morgan Engineering Co., The, Alliance, O.  
National Roll & Fdry. Co., Avonmore, Pa.  
Standard Machinery Co., Providence, R. I.  
United Engineering & Fdry. Co., Pgh.  
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

## ROLLS—Alloy Steel

Pittsburgh (Pa.) Rolls Corp.

## ROLLS—Bending and Straightening

Baldwin-Southwark Corp., Southwark Div., Philadelphia.  
Berisch & Co., Cambridge City, Ind.  
Kane & Roach, Inc., Syracuse, New York.  
Niagara Machine & Tool Works, Buffalo, N. Y.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

## ROLLS—Rubber Covered

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

## ROLLS—Sand Chilled Iron and Steel

Aetna-Standard Engineering Co., The, Youngstown, Ohio.  
Hyde Park (Pa.) Fdry. & Mch. Co.

Lewis Foundry & Mch. Co., Pittsburgh.  
Mackintosh-Hemphill Co., Pittsburgh.  
Mesta Mch. Co., Pittsburgh.  
National Roll & Fdry. Co., Avonmore, Pa.  
Pittsburgh (Pa.) Rolls Corp.  
United Engineering & Fdry. Co., Pgh.

## ROLLS—Special Hardened

Midvale Co., The, Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel  
Newport (Ky.) Rolling Mill Co., The.  
Superior Sheet Steel Co., Canton, Ohio.

## ROOFING AND SIDING—Corrugated and Plain

American Rolling Mill Co., Middletown, O.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Johns-Manville Corp., 22 East 40th St., New York City.

Newport (Ky.) Rolling Mill Co., The.  
Weirton (W. Va.) Steel Co.  
Youngstown (Ohio) Sheet & Tube Co., The.

## ROOFING AND SIDING—Genuine Open Hearth Iron

Newport (Ky.) Rolling Mill Co.

## ROOFING AND SIDING—Iron and Steel

Inland Steel Co., Chicago.  
Newport (Ky.) Rolling Mill Co., The.

## ROOFING & SIDING—(Zinc)—Corrugated & Plain

New Jersey Zinc Co., The, 160 Front St., N. Y. C.

## ROOFING MATERIALS

Carey, Philip, Co., The, Cincinnati.

## RUBBER LININGS

Goodrich, B. F. Co., The, Akron, Ohio.  
Goodyear Tire & Rubber Co., Akron, Ohio.

## RUBBER MOLDED PARTS

Goodyear Tire & Rubber Co., Akron, Ohio.  
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.  
Richardson Co., The, Melrose Park, Ill.

## RUST PREVENTIVES

American Chemical Paint Co., Ambler, Pa.  
American Lanolin Corp., Lawrence, Mass.  
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

## RUST PROOFING COMPOUNDS

Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

## RUST PROOFING PROCESS

American Chemical Paint Co., Ambler, Pa.  
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.  
Udylite Co., The, Detroit.

## RUST REMOVING

Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

## SAND BLAST EQUIPMENT AND MACHINES

American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.  
Panghorn Corporation, Hagerstown, Md.

## SAND BLAST STEEL SHOT

American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.  
Pittsburgh (Pa.) Crushed Steel Co.

## SAND HANDLING EQUIPMENT

Bartlett, C. O., & Snow Co., The, Cleveland.  
Jeffrey Mfg. Co., The, Columbus, Ohio.

## SAWING MACHINES—Metal

Espen-Lucas Mch. Works, Phila.  
Heller Machine Co., 114 Liberty St., N. Y. C.  
Peerless Mch. Co., Racine, Wis.

## SAWING MACHINES—Metal-Band

Continental Machine Specialties, Inc., Minneapolis, Minn.

## SAWS—Band and Hack for Metal

Armstrong-Blum Mfg. Co., Chicago.  
Atkins, E. C., & Co., Indianapolis.  
Diston, Henry, & Sons, Inc., Philadelphia.  
Wells Mfg. Corp., Three Rivers, Mich.

## SAWS—Circular, Rip & Cutoff

Atkins, E. C., & Co., Indianapolis.

## SAWS—Friction

Atkins, E. C., & Co., Indianapolis.  
Diston, Henry, & Sons, Inc., Philadelphia.

## SAWS—Hack Saw Blades

Atkins, E. C., & Co., Indianapolis.  
Peerless Mch. Co., Racine, Wis.  
Starrett, L. S. Co., Athol, Mass.

## SAWS—Hot Metal

Atkins, E. C., & Co., Indianapolis.  
Diston, Henry, & Sons, Inc., Philadelphia.

## SAWS—Inserted Tooth, Cold

Diston, Henry, & Sons, Inc., Philadelphia.  
Taber Mfg. Co., Philadelphia.

## SAWS—Milling

Atkins, E. C., & Co., Indianapolis.  
Diston, Henry, & Sons, Inc., Philadelphia.

## SCALES

Exact Weight Scale Co., Columbus, Ohio.

Fairbanks, Morse & Co., Chicago.

## SCREENS—Manganese Steel

Manganese Steel Forge Co., Phila., Pa.

## SCREENS—Perforated Metal

Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.

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# Products Index

Diamond Mfg. Co., Wyoming, Pa.  
Erdle Perforating Co., Rochester, N. Y.  
Harrington & King Perforating Co., Chicago.

Hendrick Mfg. Co., Carbondale, Pa.  
Mundt, Chas. & Sons, 59 Fairmount Ave., Jersey City, N. J.

**SCREENS—Woven Wire**  
Michigan Wire Cloth Co., 2117 Howard St., Detroit.

Wickwire Brothers, Cortland, N. Y.  
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

**SCREW MACHINE PRODUCTS**  
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.  
Blake & Johnson Co., The, Waterville, Ct.  
Commonwealth Brass Corp., Detroit.

Eastern Mch. Screw Corp., New Haven.  
Houde Engineering Corp., Buffalo, N. Y.  
National Acme Co., The, Cleveland.  
Olson Mfg. Co., Worcester, Mass.  
Ottemiller, Wm. H. Co., Inc., York, Pa.  
Progressive Mfg. Co., Torrington, Conn.  
Screw Mch. Products Corp., Prov., R. I.

**SCREW MACHINERY—Automatic**  
Cone Automatic Mch. Co., Inc., Windsor, Vt.

National Acme Co., The, Cleveland.

**SCREW MACHINERY—Hand**  
Warner & Swasey Co., The, Cleveland.

**SCREW MACHINERY—Multiple Spindle**  
Acme Machine Tool Co., Cincinnati.  
Cone Automatic Mch. Co., Inc., Windsor, Vt.

National Acme Co., The, Cleveland.

**SCREW PLATES**  
Greenfield (Mass.) Tap & Die Corp.

**SCREW STOCK**  
Bliss & Laughlin, Inc., Harvey, Ill.  
Union Drawn Steel Co., Massillon, Ohio.

**SCREWS—Cap**  
Cleveland (Ohio) Cap Screw Co., The.  
National Acme Co., The, Cleveland.  
Ottemiller, Wm. H. Co., Inc., York, Pa.

**SCREWS—Coach or Lag**  
Lamson & Sessions Co., Inc., Cleveland.

**SCREWS—Machine**  
Blake & Johnson Co., The, Waterville, Ct.  
Progressive Mfg. Co., The, Torrington, Ct.

**SCREWS—Safety Set**  
Progressive Mfg. Co., The, Torrington, Ct.  
Standard Pressed Steel Co., Jenkintown, Pa.

**SCREWS—Set**  
Cleveland (Ohio) Cap Screw Co., The.  
National Acme Co., The, Cleveland.  
Ottemiller, Wm. H. Co., Inc., York, Pa.

**SCREWS, Socket, Head, Cap**  
Standard Pressed Steel Co., Jenkintown, Pa.

**SCREWS—Thumb**  
Parker-Kalon Corp., 196 Varick St., N. Y.

**SCREUBING MACHINES—Sheet**  
Wean Engineering Co., Inc., The, Warren, Ohio.

**SCYTHE STONES AND WHETSTONES**  
Carborundum Co., The, Niagara Falls, N. Y.

**SECOND - HAND MACHINERY—(See Clearing House Section)**

**SEPARATORS—Magnetic**  
Dings Magnetic Separator Co., Milwaukee, Ohio.  
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

**SHAFTING—Cold Drawn**  
Union Drawn Steel Co., Massillon, Ohio.  
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

**SHAFTING—Steel**  
Bliss & Laughlin, Inc., Harvey, Ill.  
Union Drawn Steel Co., Massillon, Ohio.

**SHAFTING—Turned and Ground**  
Bliss & Laughlin, Inc., Harvey, Ill.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Union Drawn Steel Co., Massillon, Ohio.  
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

**SHAPERS**  
Cincinnati (Ohio) Shaper Co., The.

**SHAPERS—Vertical**  
Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

**SHAPES—Cold Drawn**  
Bliss & Laughlin, Inc., Harvey, Ill.  
Union Drawn Steel Co., Massillon, Ohio.  
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

**SHAPES—Wire**  
Cuyahoga Spring Co., The, Cleveland.  
Eastern Tool & Mfg. Co., Bloomfield, N. J.  
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Roebbing's, John A. Sons Co., Trenton, N. J.

**SHEAR BLADES & KNIVES**  
American Shear Knife Co., Homestead, Pa.

**SHEARING MACHINES—Alligator**  
Canton Fdry. & Mch. Co., Cleveland.

**SHEARING MACHINES—Angle, Hand and Power**  
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

**SHEARING MACHINES—Par**  
G. D. S. Shearing & Punching Machine Co., 101 Walker St., N. Y. C.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

**SHEARING MACHINES—Plate**  
Bertsch & Co., Cambridge City, Ind.  
Cincinnati (Ohio) Shaper Co., The.  
Dreis & Krump Mfg. Co., Chicago.  
Mesta Mch. Co., Pittsburgh.  
Morgan Engineering Co., The, Alliance, O.  
Niagara Machine & Tool Works, Buffalo, N. Y.

Pels, Henry, & Co., Inc., 90 West St., N. Y. C.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
United Engineering & Fdry. Co., Pgh.

**SHEARING MACHINES—Beam and Channel**  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
United Engineering & Fdry. Co., Pgh.

**SHEARING MACHINES—Billet**  
Morgan Engineering Co., The, Alliance, O.  
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.  
United Engineering & Fdry. Co., Pgh.

**SHEARING MACHINES—Continuous Sheet & Pack**  
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

**SHEARING MACHINES—Plate**  
Bertsch & Co., Cambridge City, Ind.  
Cincinnati (Ohio) Shaper Co., The.  
Dreis & Krump Mfg. Co., Chicago.

Mesta Mch. Co., Pittsburgh.  
Morgan Engineering Co., The, Alliance, O.  
Niagara Machine & Tool Works, Buffalo, N. Y.

Pels, Henry, & Co., Inc., 90 West St., N. Y. C.  
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

United Engineering & Fdry. Co., Pgh.

**SHEARING MACHINES—Sheet and Plate**  
Beatty Mch. & Mfg. Co., 936-150th St., Hammond, Ind.

Cincinnati (Ohio) Shaper Co., The.  
Dreis & Krump Mfg. Co., Chicago.  
Niagara Mach. & Tool Wks., Buffalo, N. Y.

**SHEARING MACHINES—Squaring**  
Cincinnati (Ohio) Shaper Co., The.  
Dreis & Krump Mfg. Co., Chicago.

Niagara Mach. & Tool Wks., Buffalo, N. Y.

**SHEARS—Hand for Sheet Metal**  
Bremil Mfg. Co., Erie, Pa.

**SHEAVES—V-Belt—Cast Iron**  
Lindermere Machine & Tool Co., Detroit.

**SHEET BARS**  
Andrews Steel Co., The, Newport, Ky.  
Jones & Laughlin Steel Corp., Pittsburgh.

**SHEET METAL MACHINERY**  
Cincinnati (Ohio) Shaper Co., The.  
Dreis & Krump Mfg. Co., Chicago.

Kane & Roach, Inc., Syracuse, New York.  
New Albany (Ind.) Mch. Mfg. Co.  
Niagara Mach. & Tool Wks., Buffalo, N. Y.

V & O Press Co., Hudson, N. Y.  
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

**SHEETS—Aluminum**  
Aluminum Co. of America, Pittsburgh.

**SHEETS—Auto Body**  
American Rolling Mill Co., Middletown, O.  
Bethlehem (Pa.) Steel Co.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Inland Steel Co., Chicago.  
Republic Steel Corp., Cleveland, Ohio.  
Youngstown (Ohio) Sheet & Tube Co., The.

**SHEETS—Black**  
American Rolling Mill Co., Middletown, O.  
Bethlehem (Pa.) Steel Co.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.  
Granite City (Ill.) Steel Co., Chicago.

Inland Steel Co., Chicago.  
Newport (Ky.) Rolling Mill Co., The.  
Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T. & Son, Inc., Chicago.  
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Weirton (W. Va.) Steel Co.

**SHEETS—Blue Annealed**  
Alan Wood Steel Co., Conshohocken, Pa.  
American Rolling Mill Co., Middletown, O.  
Bethlehem (Pa.) Steel Co.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Central Iron & Steel Co., Harrisburg, Pa.  
Granite City (Ill.) Steel Co.  
Great Lakes Steel Corp., Detroit.

Newport (Ky.) Rolling Mill Co., The.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Weirton (W. Va.) Steel Co.

Worth Steel Co., Claymont, Del.

**SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze**  
American Brass Co., The, Waterbury, Conn.  
Phosphor Bronze Smelting Co., The, Phila.  
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Riverside (N. J.) Metal Co.  
Seymour (Conn.) Mfg. Co.

**SHEETS—Chrome**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

**SHEETS—Chrome Nickel**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

**SHEETS—Cold Rolled**  
American Rolling Mill Co., Middletown, O.  
Bethlehem (Pa.) Steel Co.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Great Lakes Steel Corp., Detroit.  
Inland Steel Co., Chicago.  
Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T. & Son, Inc., Chicago.  
Weirton (W. Va.) Steel Co.

**SHEETS—Copper Alloy**  
American Brass Co., The, Waterbury, Conn.

**SHEETS—Copper Steel**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Inland Steel Co., Chicago.  
Newport (Ky.) Rolling Mill Co., The.

**SHEETS—Electrical**  
American Rolling Mill Co., Middletown, O.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.  
Republic Steel Corp., Cleveland, Ohio.

**SHEETS—Enameling**  
American Rolling Mill Co., Middletown, O.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.  
Great Lakes Steel Corp., Detroit.

Inland Steel Co., Chicago.  
Newport (Ky.) Rolling Mill Co., The.

**SHEETS—For Drawing and Stamping**  
American Rolling Mill Co., Middletown, O.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.  
Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T. & Son, Inc., Chicago.  
Superior Sheet Steel Co., Canton, Ohio.  
Worth Steel Co., Claymont, Del.

**SHEETS—Full Finished**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.  
Republic Steel Corp., Cleveland, Ohio.  
Youngstown (Ohio) Sheet & Tube Co., The.

**SHEETS—Galvanized, Flat and Corrugated**  
American Rolling Mill Co., Middletown, O.  
Bethlehem (Pa.) Steel Co.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.  
Continental Steel Corp., Kokomo, Ind.

Granite City (Ill.) Steel Co.  
Inland Steel Co., Chicago.  
Newport (Ky.) Rolling Mill Co., The.

Republic Steel Corp., Cleveland, Ohio.  
Ryerson, Jos. T. & Son, Inc., Chicago.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Weirton (W. Va.) Steel Co.  
Youngstown (Ohio) Sheet & Tube Co., The.

**SHEETS—Long Terme**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.  
Weirton (W. Va.) Steel Co.

**SHEETS—Magnesium Alloys**  
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

**SHEETS—Metal Furniture**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.  
Republic Steel Corp., Cleveland, Ohio.

**SHEETS—Pickled**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.

**SHEETS—Tin Mill Black**  
American Rolling Mill Co., Middletown, O.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Newport (Ky.) Rolling Mill Co., The.

**SHEETS—Zinc**  
New Jersey Zinc Co., The, 160 Front St., Ohio.

**SHELVING—Steel**  
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

**SILICO—MANGANESE**  
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

**SILICON METAL & ALLOYS**  
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

**SLABS**  
Andrews Steel Co., The, Newport, Ky.

**SLINGS—Wire Rope**  
Roebbing's, John A. Sons Co., Trenton, N. J.

**SOLVENTS—Oil & Grease**  
Detroit Rex Products Co., Detroit, Mich.

**SPACING TABLES—Punching & Shearing**  
Thomas Spacing Mch. Co., Pittsburgh.

**SPECIAL MACHINERY**  
Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Bullard Co., The, Bridgeport, Conn.  
Eastern Tool & Mfg. Co., Bloomfield, N. J.  
Houde Engineering Corp., Buffalo, N. Y.

Manville, E. J., Mch. Co., Waterbury, Ct.  
Morgan Engineering Co., The, Alliance, O.  
National Rubber Machinery Co., Clifton, N. J.

Taft-Pelree Mfg. Co., The, Woonsocket, R. I.  
Wood, R. D., & Co., Philadelphia.

**SPECIALTIES—Rubber Covered & Lined**  
Goodrich, B. F., Co., The, Akron, Ohio.

**SPEED REDUCERS**  
Boston Gear Wks., Inc., North Quincy, Mass.

Cleveland (Ohio) Worm & Gear Co.  
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.

James, D. O., Mfg. Co., Chicago.  
Jones, W. A., Fdry. & Mch. Co., 1401 Roosevelt Rd., Chicago.

Link-Belt Co., Chicago.  
Morse Chain Co., Ithaca, New York.  
Philadelphia (Pa.) Gear Works.

**SPIEGELEISEN**  
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

**SPIKES—Screw**  
Oliver Iron & Steel Corp., Pittsburgh.

**SPIKES—Track**  
Ames, W. & Co., Jersey City, N. J.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Weirton (W. Va.) Steel Co.

**SPINDLES—Grinding**  
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

**SPINDLES—Hollow Bored**  
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

**SPICE BARS**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

**SPRAY FINISHING EQUIPMENT**  
DeVilbiss Co., The, Toledo, Ohio.

**SPRAYERS—Paint**  
DeVilbiss Co., The, Toledo, Ohio.

**STEEL MAKING MACHINERY**  
Baird Mch. Co., The, Bridgeport, Conn.  
Sleeper & Hartley, Inc., Worcester, Mass.

**SPRINGS—Car**  
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

**SPRINGS—Extension, Compression, Torsion or Flat**  
Amer. Spring & Mfg. Corp., Holly, Mich.  
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.

Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.

Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.

Cuyahoga Spring Co., The, Cleveland.  
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.

Gibson, Wm. D. Co., Div. of Associated Spring Corp., Chicago.

Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Spencer Steel Co., 11 East 42nd St., N. Y. C.

**SPROCKETS**  
Baldwin-Duckworth Chain Corp., Springfield, Mass.

Boston Gear Wks., Inc., North Quincy, Mass.

Diamond Chain & Mfg. Co., Indianapolis, Ind.

Morse Chain Co., Ithaca, New York.  
Whitney Chain & Mfg. Co., Hartford, Ct.

**STAMPINGS OR DRAWINGS—Metal**  
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.

Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.

Central Iron & Steel Co., Harrisburg, Pa.  
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.

Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.

Crosby Co., The, Buffalo, N. Y.  
Dayton Rogers Mfg. Co., Minneapolis, Minn.

Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.

E. S. M. C. O. Auto Products Corp., Bush Terminal Bldg. 27, Bklyn., N. Y.

Eastern Tool & Stpg. Co., Inc., Saugus, Mass.

Gibson, Wm. D. Co., Div. of Associated Spring Corp., Chicago.  
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

Lansing (Mich.) Stamping Co., So. Penn. Ave.

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

Parish Pressed Steel Co., Reading, Pa.

Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.

Sansom, W. J. Co., 20 W. Jackson Blvd., Chicago.

Sessions, J. H., & Son, Bristol, Conn.

Toledo (Ohio) Stamping & Mfg. Co.

Torrington (Conn.) Company

# Products Index

Truscon Steel Co., Pressed Steel Div., Cleveland.  
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.  
Worcester (Mass.) Stamped Metal Co.  
**STAMPS—Steel Alphabets and Figures**  
Cunningham, M. E. Co., Pittsburgh.  
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

**STAPLES—Wire**  
Wickwire Brothers, Cortland, N. Y.  
**STEEL—Acid Resisting**  
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

**STEEL—Alloy**  
Alan Wood Steel Co., Conshohocken, Pa.  
Andrews Steel Co., The, Newport, Ky.  
Bethlehem (Pa.) Steel Company.  
Bisset Steel Co., The, Cleveland.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Harrisburg (Pa.) Steel Corp.  
Ingersoll Steel & Disc Co., Chicago.  
Jesse Steel Co., Washington, Pa.  
Labro (Pa.) Electric Steel Co.  
Ludlum Steel Co., Watervliet, N. Y.  
Republic Steel Corp., Cleveland, Ohio.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.  
Timken Roller Bearing Co., The, Canton, O.  
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.  
Vanadium-Alloys Steel Co., Labro, Pa.  
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

**STEEL—Alloy, Cold Drawn**  
Bliss & Laughlin, Inc., Harvey, Ill.  
Union Drawn Steel Co., Massillon, Ohio.  
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.  
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

**STEEL—Bright Finished**  
Bliss & Laughlin, Inc., Harvey, Ill.  
Union Drawn Steel Co., Massillon, Ohio.

**STEEL—Carbon**  
Andrews Steel Co., The, Newport, Ky.  
Bethlehem (Pa.) Steel Co.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Harrisburg (Pa.) Steel Corp.  
Ingersoll Steel & Disc Co., Chicago.  
Labro (Pa.) Electric Steel Co.

**STEEL—Carbon Vanadium**  
Andrews Steel Co., The, Newport, Ky.  
Labro (Pa.) Electric Steel Co.

**STEEL—Chrome**  
Andrews Steel Co., The, Newport, Ky.  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Labro (Pa.) Electric Steel Co.

**STEEL—Chrome Manganese**  
Labro (Pa.) Electric Steel Co.

**STEEL—Chrome Nickel**  
Andrews Steel Co., The, Newport, Ky.  
Harrisburg (Pa.) Steel Corp.  
Labro (Pa.) Electric Steel Co.

**STEEL—Chrome Nickel Silver**  
Ingersoll Steel & Disc Co., Chicago.

**STEEL—Chrome Vanadium**  
Andrews Steel Co., The, Newport, Ky.  
Harrisburg (Pa.) Steel Corp.  
Labro (Pa.) Electric Steel Co.

**STEEL—Cobalt**  
Darwin & Milner, Inc., Cleveland.

**STEEL—Cold Drawn**  
Bliss & Laughlin, Inc., Harvey, Ill.  
Jones & Laughlin Steel Corp., Pittsburgh.  
Labro (Pa.) Electric Steel Co.  
Rathbone, A. B. & J., Palmer, Mass.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Union Drawn Steel Co., Massillon, Ohio.  
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

**STEEL—Cold Rolled Strips**  
Acme Steel Co., Chicago.  
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.  
Athena Steel Co., Clifton, N. J.  
Bethlehem (Pa.) Steel Co.  
Cold Metal Process Co., The, Youngstown, Ohio.  
Griffin Mfg. Co., Erie, Pa.  
Labro (Pa.) Electric Steel Co.  
Republic Steel Corp., Cleveland, Ohio.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.  
Stanley Works, The, New Britain, Conn.  
Bridgeport, Conn.  
Steel & Tubes, Inc., Cleveland.  
Superior Steel Corp., Grant Bldg., Pgh.  
Thomas Steel Co., The, Warren, Ohio.  
Weirton (W. Va.) Steel Co.  
Wetherill Bros. Co., Cambridge, 39, Mass.

**STEEL—Cold Rolled Strips, Electro Copper Coated**  
Thomas Steel Co., The, Warren, Ohio.

**STEEL—Cold Rolled Strips, Electro Galvanized**  
Acme Steel Co., Chicago, Ill.  
Thomas Steel Co., The, Warren, Ohio.

**STEEL—Cold Rolled Strips, Electro Tin Coated**  
Thomas Steel Co., The, Warren, Ohio.

**STEEL—Cold Rolled Strips, Stainless**  
Acme Steel Co., Chicago.  
Griffin Mfg. Co., Erie, Pa.

**STEEL—Corrosion Resisting**  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Midvale Co., The, Nicetown, Phila., Pa.

**STEEL—Crucible**  
Jesse Steel Co., Washington, Pa.  
Vanadium-Alloys Steel Co., Labro, Pa.

**STEEL—Cutlery**  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Jesse Steel Co., Washington, Pa.  
Labro (Pa.) Electric Steel Co.  
Ludlum Steel Co., Watervliet, N. Y.

**STEEL—Die**  
Andrews Steel Co., The, Newport, Ky.  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Diston, Henry & Sons, Inc., Philadelphia.  
Jesse, Wm., & Sons, Inc., 121 Varick St., N. Y. C.

**STEEL—Drill**  
Labro (Pa.) Electric Steel Co.  
Ludlum Steel Co., Watervliet, N. Y.  
Milne, A., & Co., 745 Washington St., N. Y. C.

**STEEL—Electric**  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Diston, Henry & Sons, Inc., Philadelphia.  
Labro (Pa.) Electric Steel Co.  
Ludlum Steel Co., Watervliet, N. Y.  
Timken Roller Bearing Co., The, Canton, O.  
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.  
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

**STEEL—High Speed**  
Bethlehem (Pa.) Steel Company.  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Diston, Henry & Sons, Inc., Philadelphia.  
Labro (Pa.) Electric Steel Co.  
Ludlum Steel Co., Watervliet, N. Y.  
Timken Roller Bearing Co., The, Canton, O.  
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.  
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

**STEEL—Hot Rolled Strips**  
Acme Steel Co., Chicago.  
Bethlehem (Pa.) Steel Co.  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Great Lakes Steel Corp., Detroit.  
Inland Steel Co., Chicago.  
Lachite Steel Co., St. Louis, Mo.  
Labro (Pa.) Electric Steel Co.  
Republic Steel Corp., Cleveland, Ohio.  
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.  
Stanley Works, The, New Britain, Conn.  
Steel & Tubes, Inc., Cleveland.  
Superior Steel Corp., Grant Bldg., Pgh.  
Weirton (W. Va.) Steel Co.

**STEEL—Hot Rolled Strips, Electro Zinc Coated**  
Thomas Steel Co., The, Warren, Ohio.

**STEEL—Hot Rolled Strips, Galvanized**  
Acme Steel Co., Chicago.

**STEEL—Magnet**  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Labro (Pa.) Electric Steel Co.

**STEEL—Nickel**  
Andrews Steel Co., The, Newport, Ky.

**STEEL—Open Hearth**  
Andrews Steel Co., The, Newport, Ky.  
Pittsburgh (Pa.) Steel Co.  
Timken Roller Bearing Co., The, Canton, O.  
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

**STEEL—Rolled Manganese**  
Manganese Steel Forge Co., Phila.

**STEEL—Rustless**  
Acme Steel Co., Chicago.  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Griffin Mfg. Co., Erie, Pa.  
Labro (Pa.) Electric Steel Co.  
Ludlum Steel Co., Watervliet, N. Y.

**STEEL—Screw**  
Bliss & Laughlin, Inc., Harvey, Ill.  
Timken Roller Bearing Co., The, Canton, O.  
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.  
Union Drawn Steel Co., Massillon, Ohio.  
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

**STEEL—Special Analysis**  
Andrews Steel Co., The, Newport, Ky.  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Harrisburg (Pa.) Steel Corp.  
Labro (Pa.) Electric Steel Co.  
Ludlum Steel Co., Watervliet, N. Y.  
Republic Steel Corp., Cleveland, Ohio.  
Timken Roller Bearing Co., The, Canton, O.  
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

**STEEL—Spring**  
Athena Steel Co., Clifton, N. J.  
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.  
Barnes, Wallace, Co., The, Div. of Associated Spring Corp., Bristol, Conn.

Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.  
Great Lakes Steel Corp., Detroit.  
Republic Steel Corp., Cleveland, Ohio.  
Timken Roller Bearing Co., The, Canton, O.  
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

**STEEL—Stainless**  
Acme Steel Co., Chicago.  
American Rolling Mill Co., Middletown, O.  
Bethlehem (Pa.) Steel Company.  
Carnegie-Illinois Steel Co. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

**STEEL—Tool**  
Bethlehem (Pa.) Steel Company.  
Bisset Steel Co., The, Cleveland.  
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.  
Darwin & Milner, Inc., Cleveland.  
Diston, Henry & Sons, Inc., Philadelphia.  
Ingersoll Steel & Disc Co., Chicago.  
Jesse Steel Co., Washington, Pa.  
Jesse, Wm., & Sons, Inc., 121 Varick St., N. Y. C.

**STEEL—Tool, Special Shapes**  
Forging & Casting Corp., The, Ferndale, Mich.  
Labro (Pa.) Electric Steel Co.

**STEEL—Vanadium**  
Andrews Steel Co., The, Newport, Ky.  
Labro (Pa.) Electric Steel Co.

**STEEL PLANTS AND ROLLING MILLS**  
Brassett, H. A., & Co., Chicago, Ill.

**STEEL ROLLS**  
United Engineering & Fdry. Co., Pgh.

**STOKERS**  
Babcock & Wilcox, The, 85 Liberty St., New York City.  
Whiting Corp., Harvey, Ill.

**STOP WATCHES**  
Stillman, M. J., Co., Inc., Chicago.

**STOPS—Crane Limit**  
Electric Controller & Mfg. Co., The, Cleveland.

**STRAIGHTENING MACHINES—Bar & Tube**  
Aetna-Standard Engineering Co., The, Youngstown, Ohio.  
Kane & Boach, Inc., Syracuse, New York.  
Medart Co., The, St. Louis, Mo.

**STRAIGHTENING MACHINES—Wire**  
Kane & Boach, Inc., Syracuse, New York.

**STRUCTURAL IRON AND STEEL WORK**  
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Bethlehem (Pa.) Steel Co.  
Morgan Engineering Co., The, Alliance, O.

**STRUCTURAL STEEL—See Angles, Beams, Channels and Tees**

**STUDS**  
Erie (Pa.) Bolt & Nut Co.

**SUPERHEATERS**  
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

**SWAGING MACHINES**  
Standard Machinery Co., Providence, R. I.  
Torrington (Conn.) Company.

**SWITCHES—Electric**  
Westinghouse Elec. & Mfg. Co., East Pgh.

**TANK LININGS**  
Cellulose Co., The, Cleveland.  
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

**TANK LININGS—Rubber**  
Goodrich, B. F., Co., The, Akron, Ohio.  
Goodyear Tire & Rubber Co., Akron, Ohio.  
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

**TANKS—Alkali Cleaning**  
Detroit Rex Products Co., Detroit, Mich.

**TANKS—Compressed Air, Gas, Oil and Water**  
Petroleum Iron Works Co., The, Sharon, Pa.  
Scalfie, Wm. B., & Sons Co., Pgh.  
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

**TANKS—Iron and Steel**  
Munroe R., & Sons Mfg. Corp., Pittsburgh.  
Petroleum Iron Works Co., The, Sharon, Pa.  
Scalfie, Wm. B., & Sons Co., Pgh.

**TANKS—Lead Lined**  
Dietzel Lead Burning Co., Pittsburgh.

**TANKS—Pickling**  
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.  
Blaw-Knox Co., Pittsburgh.  
Cleveland (Ohio) Quarries Co., The, Goodrich, B. F., Co., The, Akron, Ohio.  
Goodyear Tire & Rubber Co., Akron, Ohio.  
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.  
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

**TANKS—Rubber Lined**  
Blaw-Knox Co., Pittsburgh.  
Goodrich, B. F., Co., The, Akron, Ohio.  
Goodyear Tire & Rubber Co., Akron, Ohio.  
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

**TANKS—Welded**  
Blaw-Knox Co., Pittsburgh.  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Petroleum Iron Works Co., The, Sharon, Pa.  
Scalfie, Wm. B., & Sons Co., Pgh.

**TAPPING MACHINES**  
Baker Bros. Inc., Toledo, Ohio.  
Ex-Cell-O Corp., 1290 Oakman Blvd., Detroit.

**TAPS—Collapsing**  
Geometric Tool Co., The, New Haven, Conn.  
Landis Mach. Co., Inc., Waynesboro, Pa.  
Murphy Machine & Tool Co., Detroit.  
National Acme Co., The, Cleveland.

**TAPS AND DIES**  
Greenfield (Mass.) Tap & Die Corp.  
Landis Mach. Co., Inc., Waynesboro, Pa.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.  
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

**TEES—See Angles, Beams, Channels and Tees**

**TELEPHONES—Interior**  
Screw Machine Products Corp., Prov., R. I.

**TERNE PLATES**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Weirton (W. Va.) Steel Co.

**TESTING MACHINES—Materials**  
Baldwin-Southwark Corp., Southwark Div., Phila.

**THERMOMETERS—Recording**  
Leeds & Northrup Co., Philadelphia.

**THREAD CUTTING TOOLS—See Die Taps**

**THREAD ROLLING MACHINES**  
Manville, E. J., Mch. Co., Waterbury, Ct.  
Nilson, A. H., Mch. Co., Bridgeport, Ct.  
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

**THREADING MACHINES**  
Eastern Mesh. Screw Corp., New Haven, Conn.  
Geometric Tool Co., The, New Haven, Conn.  
Landis Mach. Co., Inc., Waynesboro, Pa.

**THREADING MACHINES—Automatic**  
Landis Mach. Co., Inc., Waynesboro, Pa.

**THREADING MACHINES—Bolt**  
Murphy Machine & Tool Co., Detroit.

**TIE PLATES**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Weirton (W. Va.) Steel Co.

**TIES—BALE**  
Acme Steel Co., Chicago, Ill.

**TIMING INSTRUMENTS**  
Stillman, M. J., Co., Inc., Chicago.

**TIN PLATE**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.  
Granite City (Ill.) Steel Co.  
Inland Steel Co., Chicago.  
Jones & Laughlin Steel Corp., Pittsburgh.  
Republic Steel Corp., Cleveland, Ohio.  
Ryerson, Jos. T. & Son, Inc., Chicago.  
Weirton (W. Va.) Steel Co.  
Youngstown (Ohio) Sheet & Tube Co., The.

**TIN PLATE MACHINE**  
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

**TINNING EQUIPMENT—Sheets**  
Wean Engineering Co., Inc., The, Warren, Ohio.

**TOOL BITS**  
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

**TOOL HOLDERS**  
Armstrong Bros. Tool Co., Chicago.  
Williams, J. H., & Co., Buffalo, N. Y.

**TOOLS—Lathe**  
Armstrong Bros. Tool Co., Chicago.  
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

**TOOLS—Metal Cutting**  
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.  
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

**TOOLS—Precision**  
Starrett, L. S., Co., Athol, Mass.

**TOOLS—Safety. Steel Stamp**  
Cunningham, M. E., Co., Pittsburgh.



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## Products Index

- TOOLS—Tungsten Carbide**  
Carboly Co., Inc., 2935 E. Jefferson Ave., Detroit.  
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
- TORCHES—Brazing, Cutting and Welding**  
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.  
Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.  
Allburn, Alexander Co., The, Baltimore, Md.  
Weidit Acetylene Co., Detroit.
- TORCHES—Gas**  
Torit Mfg. Co., St. Paul, Minn.
- TRACTORS AND TRAILERS—See Trucks, Tractors and Trailers—Industrial**
- TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial**
- TRAMRAILS—Overhead Systems**  
Cleveland Tramrail Div. of The Cleveland Crane & Eng'g. Co., Wickliffe, Ohio.  
Harnischfeger Corp., 4101 W. National Ave., Milwaukee.
- TRAMWAYS—Wire Rope**  
Leschen, A., & Sons Rope Co., St. Louis, Mo.
- TRANSCRIBING MACHINES**  
Dictaphone Sales Corp., 420 Lexington Ave., New York City.
- TRANSMISSIONS—Hydraulic**  
American Engineering Co., Philadelphia.  
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.
- TRANSMISSIONS—Variable Speed**  
Link-Belt Co., Chicago.  
Reeves Pulley Co., Columbus, Indiana.
- TRAPS—Steam**  
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.
- TREADS—Safety**  
American Pressed Steel Co., Phila., Pa.  
Blaw-Knox Co., Pittsburgh.  
Central Iron & Steel Co., Harrisburg, Pa.  
Hendrick Mfg. Co., Carbondale, Pa.  
Norton Co., Worcester, Mass.
- TROLLEYS**  
Curtis Pneumatic Machinery Co., 1948 Klenen Ave., St. Louis, Mo.
- TRUCKS—Dump (Industrial)**  
Townmotor, Inc., Cleveland.
- TRUCKS—Elevating (Power)**  
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.  
Elwell-Parker Electric Co., The, Cleveland.  
Townmotor, Inc., Cleveland.  
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.
- TRUCKS—Factory, Hand**  
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.
- TRUCKS—Lift (Hand & Foot)**  
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.  
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.
- TRUCKS—Scoop (Industrial)**  
Townmotor, Inc., Cleveland.
- TRUCKS, TRACTORS AND TRAILERS—Industrial**  
Atlas Car & Mfg. Co., The, Cleveland.  
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.  
Elwell-Parker Electric Co., The, Cleveland.  
Townmotor, Inc., Cleveland.  
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.
- TUBE MILL MACHINERY**  
Actna-Standard Engineering Co., The, Youngstown, Ohio.  
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.  
United Engineering & Fdry. Co., Pgh. Waterbury (Conn.) Farrel Foundry & Machine Co., The.
- TUBES—Boiler**  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Pittsburgh (Pa.) Steel Co.  
Steel & Tubes, Inc., Cleveland.
- TUBES—Copper Alloy**  
American Brass Co., The, Waterbury, Conn.
- TUBES—High Carbon**  
Steel & Tubes, Inc., Cleveland.
- TUBES—Nickel Silver**  
American Brass Co., The, Waterbury, Conn.  
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
- TUBES—Stainless Steel**  
Cleveland (Ohio) Tool & Supply Co., The, National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Ryerson, Jos. T., & Son, Inc., Chicago.  
Steel & Tubes, Inc., Cleveland.
- TUBING—Aluminum Seamless**  
Aluminum Co. of America, Pittsburgh.
- TUBING—Magnesium Alloys**  
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.
- TUBING—Nichrome**  
Steel & Tubes, Inc., Cleveland.
- TUBING—Open Seam**  
Steel & Tubes, Inc., Cleveland.
- TUBING—Phosphor Bronze**  
American Brass Co., The, Waterbury, Conn.  
Phosphor Bronze Smelting Co., The, Phila.  
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
- TUBING—Rubber**  
Goodrich, B. F., Co., The, Akron, Ohio.
- TUBING—Seamless Steel**  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Pittsburgh (Pa.) Steel Co.  
Ryerson, Jos. T., & Son, Inc., Chicago.  
Steel & Tubes, Inc., Cleveland.  
Timken Roller Bearing Co., The, Canton, O.  
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.  
Youngstown (Ohio) Sheet & Tube Co., The.
- TUBING—Square and Rectangular**  
Steel & Tubes, Inc., Cleveland.
- TUBING—Stainless Steel**  
Cleveland (Ohio) Tool & Supply Co., The, Steel & Tubes, Inc., Cleveland.
- TUBING—Tinned Brass or Copper**  
Bundy Tubing Co., Detroit, Mich.
- TUBING—Tinned-Steel**  
Bundy Tubing Co., Detroit, Mich.
- TUBING—Tool Steel**  
Bissett Steel Co., The, Cleveland.
- TUBING—Welded Steel**  
Bundy Tubing Co., Detroit, Mich.  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Steel & Tubes, Inc., Cleveland.  
Youngstown (Ohio) Sheet & Tube Co., The.
- TUBULAR PRODUCTS**  
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.  
Steel & Tubes, Inc., Cleveland.
- TUMBLING BARRELS—See Barrels—Tumbling**
- TUNGSTEN—Metals & Alloys**  
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
- TUNGSTEN CARBIDE**  
Carboly Co., Inc., 2935 E. Jefferson Ave., Detroit.
- TURBINE-GENERATORS—Steam**  
General Electric Co., Schenectady, N. Y.  
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
- TURBO-COMPRESSORS**  
Spencer Turbine Co., Hartford, Conn.
- TURNABLES**  
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
- TURNABLES—Industrial**  
Canton Fdry. & Mch. Co., Cleveland.
- TWIST DRILLS**  
Cleveland (Ohio) Twist Drill Co., The, Greenfield (Mass.) Tap & Die Corp.  
Morse Twist Drill & Mch. Co., New Bedford, Mass.
- TYPE—Steel**  
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.
- UNIONS**  
Crane Co., Chicago.
- UNIT HEATERS—Electric**  
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
- VALVES—Acid Resisting**  
Dietzel Lead Burning Co., Pittsburgh.  
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
- VALVES—Air Blast for Presses**  
Littell, F. J., Mch. Co., Chicago.
- VALVES—Air & Hydraulic Control**  
Galland-Henning Mfg. Co., Milwaukee.  
Hannibal Mfg. Co., Chicago.  
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.  
Ross Operating Valve Co., Detroit.  
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
- VALVES—Gas, Water and Steam**  
Crane Co., Chicago.  
Jarecki Mfg. Co., Erie, Pa.  
North American Mfg. Co., The, Cleveland.  
Wood, R. D., & Co., Philadelphia.
- VALVES—Hydraulic**  
Baldwin-Southwark Corp., Southwark Div., Philadelphia.  
Crane Co., Chicago.  
Galland-Henning Mfg. Co., Milwaukee.  
Wood, R. D., & Co., Philadelphia.
- VALVES—Proportioning**  
North American Mfg. Co., The, Cleveland.
- VALVES—Pump, Rubber**  
Garlock Packing Co., The, Palmyra, N. Y.
- VANADIUM**  
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
- VARNISH—Acid Resisting**  
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.
- VICES**  
Cincinnati (Ohio) Milling Mch. Co., The, Jarecki Mfg. Co., Erie, Pa.
- WASHERS—Iron or Steel**  
Central Iron & Steel Co., Harrisburg, Pa.  
Sessions, J. H., & Son, Bristol, Conn.
- WASHERS—Leather**  
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
- WASHERS—Lock**  
American Nut & Bolt Fastener Co., Pittsburgh.
- Beall Tool Co., East Alton, Ill.**
- Butcher & Hart Mfg. Co., Toledo, Ohio.**
- Eaton Mfg. Co., Massillon, Ohio.**
- Helz & Helz, Inc., 33-34th St., Brooklyn, N. Y.**
- Hobbs Mfg. Co., Worcester, Mass.**
- Houde Engineering Corp., Buffalo, N. Y.**
- National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.**
- Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.**
- Positive Lock Washer Co., The, Newark, N. J.**



# Products Index

Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.  
Washburn Co., The, Worcester, Mass.

**WASHERS—Spring**  
American Nut & Bolt Fastener Co., Pittsburgh.  
Beall Tool Co., East Alton, Ill.  
Butcher & Harb Mfg. Co., Toledo, Ohio.  
Eaton Mfg. Co., Massillon, Ohio.  
Hobbs Mfg. Co., Worcester, Mass.  
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.  
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.  
Positive Lock Washer Co., The, Newark, N. J.  
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.  
Washburn Co., The, Worcester, Mass.

**WASHING MACHINES—For Metal Parts**  
Ranshoff, N. Inc., Cincinnati.

**WATER SOFTENERS AND PURIFIERS**  
Scaife, Wm. B. & Sons Co., Pith.

**WELDING—Copper Hydrogen Electric**  
Bundy Tubing Co., Detroit, Mich.

**WELDING—Electric**  
Una Welding, Inc., Cleveland, Ohio.  
Westinghouse Elec. & Mfg. Co., East Pith.

**WELDING CONTACTORS**  
Clark Controller Co., The, Cleveland.

**WELDING CONTACTS—Resistance**  
Electroloy Co., Inc., 50 Church St., New York City.

**WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene**  
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

Linde Air Prods. Co., The, 30 East 42nd St., N. Y. C.

Milburn, Alexander Co., The, Baltimore, Md.

Weldit Acetylene Co., Detroit.

**WELDING FIXTURES**  
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.

Una Welding, Inc., Cleveland, Ohio.

**WELDING MACHINES—Butt**  
Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn, Mass.

**WELDING MACHINES—Electric Arc**  
Electric Arc Cutting & Welding Co., The, Newark, N. J.

General Electric Co., Schenectady, N. Y.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.

Lincoln Electric Co., The, Cleveland.

Una Welding, Inc., Cleveland, Ohio.

Westinghouse Elec. & Mfg. Co., East Pith.

Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

**WELDING MACHINES—Electric Arc, Second-Hand.** (See Clearing House Section)

**WELDING MACHINES—Flash**  
Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn, Mass.

**WELDING MACHINES—Press**  
Swift Electric Welder Co., Detroit.

**WELDING MACHINES—Spot**  
Swift Electric Welder Co., Detroit.

Thomson-Gibb Elec. Welding Co., Lynn, Mass.

**WELDING MACHINES—Universal Spot & Arc**  
Electric Arc Cutting & Welding Co., The, Newark, N. J.

**WHEELS—Rolled Steel**  
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Standard Steel Wks. Co., Burnham, Pa.

**WIRE—Aluminum**  
Aluminum Co. of America, Pittsburgh.

**WIRE—Barb**  
Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

**WIRE—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze**  
American Brass Co., The, Waterbury, Conn.

Michigan Wire Cloth Co., 2117 Howard St., Detroit.

Phosphor Bronze Smelting Co., The, Phila.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Riverside (N. J.) Metal Co.

Seymour (Conn.) Mfg. Co.

**WIRE—Electric Heat Resisting**  
Glohar Div., The Carborundum Co., Niagara Falls, N. Y.

**WIRE—Flat, Round Square or Special Shapes**  
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.

Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Roebbing's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria, O.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

**WIRE—Insulated**  
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Roebbing's, John A., Sons Co., Trenton, N. J.

Simplex Wire & Cable Co., Cambridge A. Boston, Mass.

**WIRE—Mattress**  
Roebbing's, John A., Sons Co., Trenton, N. J.

**WIRE—Netting**  
Roebbing's, John A., Sons Co., Trenton, N. J.

Wickwire Brothers, Cortland, N. Y.

**WIRE—Piano and Music**  
Webb Wire Works, New Brunswick, N. J.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

**WIRE—Special Drawn Shapes**  
Rathbone, A. B. & J., Palmer, Mass.

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American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

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Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Roebbing's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

**WIRE—Spring (Music)**  
Webb Wire Works, New Brunswick, N. J.

**WIRE—Stainless Steel**  
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Webb Wire Works, New Brunswick, N. J.

**WIRE—Steel**  
Bethlehem (Pa.) Steel Co.

Wickwire Brothers, Cortland, N. Y.

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Simplex Wire & Cable Co., Cambridge A. Boston, Mass.

**WIRE—Welding**  
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.

Lincoln Electric Co., The, Cleveland.

Manganese Steel Forge Co., Phila., Pa.

Maurath, Inc., 7400 Union Ave., Cleveland.

Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.

Pittsburgh (Pa.) Steel Co.

Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Roebbing's, John A., Sons Co., Trenton, N. J.

Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

Una Welding, Inc., Cleveland, Ohio.

Wickwire Brothers, Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

**WIRE—Zinc**  
Platt Bros. & Co., The, Waterbury, Conn.

**WIRE CLOTH**  
Audubon Wire Cloth Corp., Phila., Pa.

Buffalo (N. Y.) Wire Wks. Co., Inc.

Michigan Wire Cloth Co., 2117 Howard St., Detroit, Mich.

Roebbing's, John A., Sons Co., Trenton, N. J.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

**WIRE DRAWING MACHINERY—See Wire Mill Machinery & Equip.**

**WIRE FORMING MACHINERY**  
Baird Mch. Co., The, Bridgeport, Conn.

Barville, E. J., Mch. Co., Waterbury, Ct.

Nilson, A. H., Mch. Co., Bridgeport, Ct.

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Hindley Mfg. Co., Valley Falls, R. I.

Pittsburgh (Pa.) Steel Co.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Bros., Cortland, N. Y.

Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

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Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Leschen, A. & Sons Rope Co., St. Louis, Mo.

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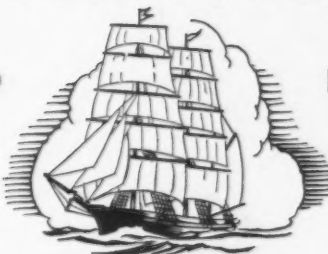
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No. 2-B, No. 3-B, No. 4-B, B. & S., plain  
No. 3-B Milwaukee, plain  
No. 4 Kemp Smith Maxi-Miller, plain  
No. 4 and No. 5 Cincinnati, plain  
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No. 2-B Milwaukee Universal  
No. 3, No. 4 Cincinnati Universal  
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60"x48"x16" Gray, arr. rev., M.D.  
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No. 173-A Consolidated Dble. Crank  
**Shapers**, 16" Gould & Eberhardt, M.D.  
16" and 20" Stockbridge  
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**Turret Lathes**, No. 4 W. & S. Univ. Turret  
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410 BROOME ST. NEW YORK

## PRESSES

No. 168 Toledo Toggle Drawing, weight 67,500 lbs.  
D, DD2 Ferracute Drawing O.B.I.  
No. 1 1/2 Bliss Cam  
P2, P3, P4 Ferracute Stiles Type  
No. 5 Bliss Stiles Type  
No. 6 Waterbury-Farrel D.C.  
No. 92B Toledo D.C. geared  
No. 30 Toledo Stiles  
No. 32P Toledo Stiles  
No. 35 Toledo B.G. Stiles Type  
851 Ferracute Double Crank  
No. 54A Toledo Special with inclining attachment  
No. 94 Bliss Consolidated

## TURRET LATHES AND SCREW MACHINES

No. 1A Warner & Swasey Universal, m.d., late type  
No. 2A, 3A Warner & Swasey Universal Turret Lathes, m.d.  
No. 2, 4, 6, 8 Warner & Swasey Turret Lathes  
No. 5A, 6A, 6C Potter & Johnston Automatics, m.d.  
Dresses Turret Lathe, 1 1/4" bar cap.  
Gisholt Simplicatic Lathe, m.d.  
2-24" Jones & Lamson 2 spindle Flat Turret Lathe, m.d.  
2 1/4"x24" Jones & Lamson, m.d. bar equipment  
3x36" Jones & Lamson, 2 spindle, m.d.  
3x36" Jones & Lamson, m.d., chucking  
3 1/4"x36" Cincinnati Acme Flat Turret, m.d., chucking

**No. 3 Cincinnati Acme Full Universal, motor drive, chucking equipment, hardened ways, latest type, like new.**

3 1/4" Gridley Single Spindle Automatic, belt  
14" Fay Automatic, single pulley drive  
21", 24" Gisholt Turret  
**No. 2F FOSTER FASTERMATIC, M.D., LIKE NEW**  
No. 2 Milbolland Turret Lathe, belt  
No. 2 Pratt & Whitney Hand Screw Machine, belt  
No. 4, 7 Bardons & Oliver Turret, belt  
No. 4 Foster Turret Lathe, belt  
No. 23, 24 New Britain Automatic, belt  
No. 54 National Acme 4 spindle Automatic, belt

## SHAPERS

16", 24" American s.p.d. thru gear box  
20" Cincinnati, cone  
24" Queen City, cone  
24" Stockbridge, m.d., D.C. motor  
25" Smith & Mills, cone

## RADIAL DRILLS

3' American Triple Purpose, m.d. on arm  
4', 5' American Triple Geared, gear box on base  
4' Morris, gear box on base  
5' Cincinnati Bickford Universal, variable speed m.d.  
6' Dresses Universal, m.d.  
2 1/2", 3" Carlton High Speed B.B. Sensitive, belt  
3" Carlton H.S. B.B. Sensitive, m.d. thru gear box  
3' Fosdick Plain, gear box, oil grooved base  
3 1/2" Carlton H.S. B.B. Sensitive, m.d.  
4" Hammond Jack Knife, m.d.  
5" Reed-Prentice Plain, m.d.  
5' Bickford Plain, d.c. motor drive  
7' Fosdick Plain, cone

## BALL BEARING DRILLS

Allen Single Spindle, 7" overhang  
No. 1/2 Avey S.S., m.d.  
Cleveland S.S., m.d.  
Henry & Wright Class B, 8" overhang  
Henry & Wright Class K, 7" overhang  
No. 1 Leland & Gifford, m.d.  
2 spindle Allen, m.d., 12" overhang  
2 spindle No. 1 Avey, 7 1/2" overhang  
2 spindle No. 2 Avey, 7 1/2" overhang  
2 spindle Fosdick, 8" overhang  
2 spindle Henry & Wright Class B, 8" overhang  
2 spindle Leland & Gifford, m.d. on spindles, 1 with power feed  
2 spindle Leland & Gifford, 7" overhang  
2 spindle Leland & Gifford, m.d., 1 with 10" overhang  
3 spindle Avey Special, m.d.  
3 spindle Demco, power feed, 8" overhang  
3 spindle Sipp, power feed, 8" overhang  
4 spindle Allen, belt  
4 spindle No. 3 Avey, m.d., 12" overhang  
4 spindle No. 2 Fosdick, belt  
4 spindle Henry & Wright Class B, belt  
5 spindle Henry & Wright Class K, belt  
6 spindle No. 1/2 Avey, 6 3/4" overhang  
6 spindle No. 1 Avey-Matic, 7 1/2" overhang  
6 spindle No. 2 Avey, 7 1/2" overhang  
6 spindle No. 3 Avey, m.d., 12" overhang  
8 spindle Allen, m.d., with motor, 12" overhang

More than 1500 machines in Stock.

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**THE EASTERN MACHINERY CO.**  
1002 TENNESSEE AVE., CINCINNATI, OHIO



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IMMEDIATE DELIVERY IS AN IMPORTANT FACTOR TODAY

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500 cu. ft. 14"x14" Bury Class L. Short Belt Drive including 75 H.P. Synchronous Motor  
529 cu. ft. 14"x12" Chicago Pneumatic Class NSBE, Motor Driven incl. 100 H.P. Slip Ring Motor  
1460 cu. ft. 14"x14"x12"x16" Bury Class VCCE, Motor Driven. Suitable for 100% Air Pressure

## BALERS

Logeman Bros. Type No. R-9. Motor Driven with 10 H.P. Motor. Size of Bale 14"x14"x13 1/2"  
Logeman Bros. Style No. 10-P Hydraulic. Complete with motor drive Triplex Pump. Size of Bale 12"x12"x11"

## BENDING ROLL

42" 2" Plate Bending Roll, Pyramid Type, Direct Connected Motor Drive. Top Roll 36" Dia., Bottom Rolls 22" Dia., Forged Steel. Steel Housings, Forged Steel Pinions, Steel Gears with Cut Teeth. Capacity Sheets 42" Long, 1" Thick Plate; Greater Thicknesses in Shorter Lengths

## DRAW BENCHES

20,000 lb. Brightman  
25,000 lb. Brightman

## EYE MACHINES

4" Coulter & McKenzie, Belt Driven  
4" Gogan, Motor Driven

## PLANERS—PLATE EDGE

27" Hilles & Jones, Belt or Motor Drive. Capacity 1 1/2" plate 20' long. Pneumatic Holddowns  
40' Planer, Arranged for Belted Motor Drive. Capacity 1 1/2" plate. Pneumatic Holddowns

## PRESSES

No. 59 Toledo Straight Side, 7" Stroke, Distance between uprights 33"  
No. 59 1/2 Toledo Straight Side, 10" Stroke, Distance between uprights 40"  
No. 424 Hamilton Straight Side, 9" Stroke, Distance between uprights 42"  
No. 8G-86 Ferracuta Straight Side, 3" Stroke, Distance between uprights 64"  
No. 10 Biles Straight Side, 7" Stroke, Distance between uprights 62"  
No. 13 Bliss Toggle Drawing, Stroke of Blankholder 18". Stroke of Punch Slide 26"

## PRESS—HYDRAULIC

1200 ton Southwark Four Column, 48" x 60" between columns. Slip Ring Motor Drive direct connected to Triplex Hydraulic Pump. Complete with Intensifier, High Pressure Piping and Valves

## SAW

52" Ryerson High Speed Friction Saw, Motor Driven. Work Table 24"x36"

## CRANES—OVERHEAD ELECTRIC TRAVELING

35 ton Northern, 28' span, Motors 220 volt DC  
30 ton Niles, 34'8" span, Motors 220 volt DC with two hoisting hooks  
25 ton Niles, 40' span, Motors 220 volt DC  
10 ton mounted on runway 280' long  
10 ton Morgan, 42' span, Motors 220 volt DC  
15 ton Whiting, 45' span, Motors 220 volt DC  
20 ton Whiting, 45' span, Motors 220 volt DC  
5 ton Shaw, 45'6" span, Motors 220/3/60 AC  
10 ton Shaw, 45'6" span, Motors 220/3/60 AC  
50 ton Shaw, 46'8" span, Motors 440/3/60 AC  
10 ton Morgan, 48'4" span, Motors 220 volt DC  
7 1/2 ton Bedford, 50' span, Motors 220/3/60 AC  
15 ton Shepard, 50' span, Motors 220 volt DC  
5 ton Alliance, 50' span, Motors 220 volt DC  
15 ton Bedford, 50' span, Motors 220/3/60 AC  
25 ton Morgan, 50' span, Motors 220 volt DC  
10 ton Cleveland, 58'2" span, Motors 220 volt DC with two 5 ton trolleys  
25 ton Morgan, 65' span, Motors 230 volt DC  
25 ton Morgan, 65' span, Motors 220 volt DC with smaller auxiliary hoist  
25 ton P. & H., 65' span, Motors 220 volt DC with 5 ton auxiliary hoist  
40 ton Niles, 71'11" span, Motors 220 volt DC with 5 ton auxiliary hoist  
5 ton P. & H., 80' span, Motors 220 volt DC  
20 ton Alliance, mounted on runway 320' long. Has two 10 ton trolleys

## CRANE-LADLE

75 ton Alliance, 55'0" span, Four Girder Ladle Crane with Two Trolleys. 25 ton Auxiliary Hoist, 95% New, Late Type

## FORGING MACHINES

2 1/2" 4" 5" Ajax, New Model Machines  
2" 3" 5" National, Steel Frame  
7" Ajax, Steel Frame

## HEADER

1 1/2" Acme Size C Arranged for Motor Drive. Equipped with automatic roll feed, rivet ejector and vertical automatic release

## HAMMERS—BOARD DROP

1600—2000—2500—3000 lb.  
Erie—Chambersburg—Billings & Spencer

## HAMMERS—STEAM DROP

3000—5000—6000—12,000 lb.  
Erie—Chambersburg—Billings & Spencer

## HAMMERS—STEAM FORGING

3500—4000—5000—6000—20,000 lb.  
Erie—Chambersburg—Niles-Bement-Pond

## ROLLING MILLS

4"x5" Torrington Single Stand, Two High Cold Rolling Mill  
8 1/2"x10" Belgian Three Stand, Two High Cold Rolling Mill  
9"x14" Cramp Single Stand, Two High  
30"x36" Two Stand, Two High Strip Mill

## SHEARS—GUILLOTINE TYPE

Garrison Bar Shear, Arranged for Motor Drive. Length of Blade 19 1/16". Capacity 5" Rounds  
Fisher Fdry. Co. Bar Shear, Arranged for Motor Drive. Length Blade 22". Capacity 3/4" thick by 15" wide hot steel

## SHEARS—SQUARING

72" Long & Allstatter, Arranged for Motor Drive. Capacity 14 ga. Spring Holddowns  
96" Bertsch, Arranged for Motor Drive. Capacity 10 ga. Spring Holddowns  
126" Stoll, Belt Driven. Capacity 10 gauge Spring Holddowns  
126" Hyde Park, Motor Driven. 18" Throat. Capacity 1/4" Plate  
126" Lewis Fdry., Motor Driven. 24" Throat. Capacity 1/4" Plate  
156" Lewis Fdry., Motor Driven. 22" Throat. Capacity 1/4" Plate

## SHEAR—ROTARY

Bliss, Belt Driven. Capacity 1/4" Plate

## SHEAR & FLANGER

No. 208A Niagara Circle Shear & Flanger, Belt Drive. Capacities: Cut No. 8 ga.; Flange No. 10 ga.; Circle from square blank 8" to 53"; Flange in dia. 14" to 73". Throat of circle arm 38 1/2"

## SLITTERS

60" Mesta Trimmer & Slitting Machine, Motor Driven. Capacity 60"x3/16"  
36" Yoder Size G-36, Motor Driven  
30" Yoder Size G-30 Special, Belt Driven

## STRAIGHTENERS

No. 1 Kane & Roach, Arranged for Motor Drive. Capacity: Angles 1 1/2"x1 1/2"x3/16". Channels 1 1/2" Flats 3/4"x1 1/2". Rounds & Squares 3/4"

## STRETCHER—HYDRAULIC

30 ton Southwark, Complete with Vertical Hydraulic Triplex Pump arranged for motor drive. Will stretch rods, tubes or strips up to 35' long, capacity 3/4"x6" strips or equivalent

## TESTING MACHINES

100,000 and 200,000 lb. Olsen Four Screw Universal

## WINDING MACHINE

Sleeper & Hartley Coil Winding Machine, Motor Drive. Capacity to coil flat ribbon .0913" on edge

## WIRE FORMING MACHINE

No. 3 Nilson Four Slide, Belt Driven

**RITTERBUSH & COMPANY, INC., 30 CHURCH STREET, NEW YORK, N. Y.**

Telephone Cortland 7-3437-3438

## GEAR CUTTERS

1—72" Cincinnati type G. Cutter  
1—100" Gould-Eberhardt Hobber

## SHAPERS

1—24" Gould-Eberhardt, S.P.D.  
2—24" American, M.D.  
1—28" Columbia Shaper  
1—28" Gould-Eberhardt

## MILLERS

1—No. 2 Kempsmith Universal  
1—No. 2-A Brown & Sharpe Univ., M. D.  
1—No. 2 Cincinnati Vertical  
1—No. 4 Cincinnati Vertical  
1—No. 5 Cincinnati Plain  
1—No. 4 Kempsmith Maxi Mill  
1—No. 3-S Cincinnati Plain

## LATHES

1—76"x52" Putnam, G. Hd., M.D.  
1—65"x32" Bement Miles Heavy Duty  
1—56"x18" N-B-Pond Heavy Duty  
1—30"x16" Houston-S-Gambel  
1—14"x 8" Lodge-Shipley, G. Hd.

## BORING MILLS

1—No. 1 and No. 2 Barrett Horizontal  
1—36" Bullard Rapid Production  
1—51" Baush Vertical  
1—53" Colburn Vertical  
1—62" Niles Vertical  
1—72" Niles Vertical  
2—90" Betts Vertical  
1—6" Espen Lucas

## PLANERS

1—72"x72"x12" N-B-Pond, M.D.  
1—56"x56"x14" Gray  
1—48"x48"x18" Cincinnati, M.D.  
1—48"x48"x16" Sellers, M.D.  
1—48"x48"x14" N-B-Pond, M.D.  
1—42"x42"x22" Cincinnati, M.D.  
1—36"x36"x14" Gray, M.D.

## GRINDER

1—14" Pratt-Whitney Vert.  
1—No. 24 Gardner Die  
1—18"x84" Landis Plain

**SIMMONS MACHINE TOOL CORP.**  
ALBANY, N. Y. New York City, 149 Broadway

## AUTOMATICS

For Immediate Delivery

Cleveland 4 1/2" Model "M" 4-Spindle Chucking Machine, M.D. by 10 H.P. 3-60-220.

Cleveland 4-Spindle 1 1/2" Chucking Machine, M.D.

National-Acme No. 56 2 1/4" 4-Spindle.

Gridley 4-Spindle 4 1/2" Automatic Chucking Machine, Model "H", M.D.

1 3/4" Gridley 4-Spindle, Model "F".

2 1/4" Gridley Single Spindle, M.D.

No. 6-A & 5-A Potter & Johnston's.

14" Fay Automatics with back angle attachment.

Many other high grade machines.

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Drexel 3300.

## 100" BORING MILL

Niles Bement Pond Vertical, motor drive, rapid traverse, 96" table, 82" under rail.

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Our location in Detroit keeps our Organization in constant touch with the largest selection of machine tools in the world.

AUTOMATICS, Gridley 2 1/4" Mtlpe. Spindle (7)  
AUTOMATICS, 4" Cleveland, Model M. Chuckers  
AUTOMATICS, Gisholt Simulmatics, M.D.  
AUTOMATICS, Cone 1 1/4", M.D.  
DRILL, Radial, 4' Morris, S.P.D.  
FURNACE, Homo Electric  
GRINDERS, No. 13 B. & S. Univ. (3)  
GRINDER, Pratt & Whitney, Surface, M.D.  
GRINDERS, No. 3 and No. 33 Abrasive, Surface  
GRINDER, No. 70 Head Duplex, Double Spindle  
GRINDERS, No. 72 Head, M.D. Hyd. Feed (3)  
GRINDER, Heim Centerless, M.D.  
GRINDER, Gardner Opposed Type, Auto. Feed, M.D.  
HOBBER, No. 16HS Gould & Eberhardt, S.P.D.  
MILL, 2 1/2" Cleveland Boring, B.M.D.  
OIL GROOVER, Wisco, late type  
PLANNER, 60"x60"x14" Niles-Bement-Pond, box table  
PLANNER, 36"x36"x14" Liberty Double Housing, M.D., 3 heads, box table  
PLANNER, 30"x30"x10" Liberty Openside, Motor Driven, with motor, 1 rail head and 1 side head  
PRESS, No. 6-D Bliss, Double Crank, Tie Rod, 12" stroke, 19" Sh. Ht., 34"x66" bol., Twin Drive  
PRESS, 50-ton Henry & Wright, M.D.  
SHEAR, 10", 1/2" United Eng'g, M.D.  
SHEAR, 10", 3/4" Pittsburgh, M.D.  
SLOTTER, 16" Betts, M.D., like new, latest type  
And a complete stock of up-to-date rebuilt equipment.

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High speed and carbon drills, taps, reamers, milling cutters, hollow mills, end mills, drill rod, etc. All made in U. S. A.

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NILES - BEMENT - POND  
MOTOR DRIVE

**ROSENKRANZ WEISBECKER & Co., Inc**

149 Broadway, N. Y. C.



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26", No. 16 Blanchard surface  
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12"x24" & 12"x48" Diamond surface  
No. 72-A-3 Heald Sizemate internal  
Nos. 70, 72 & 75 Heald internal  
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No. 4 Brown & Sharpe universal  
Norton, from 6"x32" to 14"x72"  
Landis, from 6"x18" to 16"x53"  
30"x84" Diamond face  
53", No. 49 Besly Disc, M.D.  
8" Arter automatic piston ring

### MILLERS

Nos. 1½, 2, 3B & 4B Brown & Sharpe  
Nos. 1½ B & 2A Milwaukee  
Nos. 2 & 4 LeBlond  
No. 3 Kempsmith  
No. 4 Hendey  
Nos. 2, 3, 3S & 4 Cincinnati  
No. 1½ Rockford universal  
No. 2 Cincinnati universal  
Nos. 3A & 3A Hvy. B. & S. univ.  
24" & 28" Cincinnati duplex  
24" & 48" Cincinnati automatic  
18" Cincinnati plain Mfg.  
24" & 48" Newton rotary  
48" Ohio tilted offset

### LATHES

14"x 6" American geared head  
16"x 6" Monarch  
16"x 8" Walcott, Taper & relieving  
16"x 8" & 16"x10" L. & S. geared head  
18"x 8" Boye & Emmes  
20"x 8" Monarch  
21"x18" LeBlond  
22"x10" Davis  
24"x12" Lodge & Shipley  
26"x11" Wickes  
27"x12" Schumacher Boye  
42"x42" Putnam geared head

### PRESSES

No. C4 Ferracute OBI  
No. 75 Toledo grd. open back  
Nos. P3, P4, P64, P65 Ferracute  
No. 74½ Bliss  
No. 56½ Toledo  
No. 30¾ Bliss arch frame  
150 ton Ferracute coining  
600 ton Cleveland coining  
No. 5A Bliss toggle drawing  
No. 266 Consolidated cam draw.  
No. DD654 Ferracute cam draw.  
No. 25½ Consolidated horning

2000 Tools in Stock,  
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**POWELL PLANER** 48 x 48 x 18—4 heads, 2 on cross rail, one on each side—10 years old.  
**CINCINNATI #4 PLAIN MILLER**—Power feeds in all directions, Q.C.G. & countershaft.  
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**LEBLOND #2½ UNIVERSAL MILLER**—Heavy Duty—Power feeds in all directions, Dividing heads, Vertical head, Vise, Q.C.G. & countershaft.  
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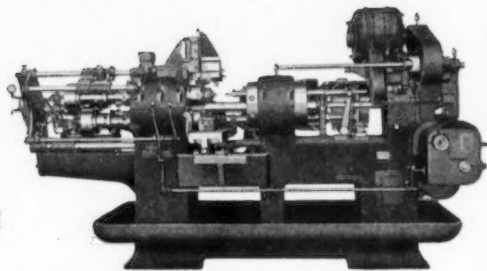
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60" Niles Roller Leveller  
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#1 Kempsmith Universal Miller, full equipment  
#3 Thiel Filing Machine  
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16 x 8 Hendey Geared Head Lathe, TA  
24 x 10 Greaves-Klusman Lathe, new  
24" Gould & Eberhardt Shaper, gear box  
2-spindle Leland-Gifford Drills, MD

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### 4-SPINDLE CHUCKERS



5—8" Cleveland Model M  
5—4½" Cleveland Model M  
1—4" Cleveland Model M

Above machines motor drive; practically new condition.  
Purchased from the Grigsby-Grunow Co.  
Ready for immediate delivery!

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### EXCELLENT CONDITION—QUICK DELIVERY

2—4¾" Four Spindle Cone Automatic Screw Machines, new in 1929.

5½" Model A Cleveland Automatic Screw Machine.

6¾" Model A Cleveland Automatic Screw Machine.

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**8 ft. RADIAL DRILL**  
**Cincinnati Bickford**  
Enclosed Head — Motor Drive  
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72" X 60" X 18'  
**OPENSIDE PLANER**  
**DETRICK & HARVEY—Motor Drive**  
**BENNETT-RAFKIN MACHINERY CORP.**  
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Procurement Division, Public Buildings Branch, Washington, D. C., June 15, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P.M., July 20, 1937, for construction of the U.S.P.O. at Wayne, Mich. Upon application, one set of drawings and specifications will be supplied free to each General Contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of \$5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U.S. Drawings and specifications will not be furnished to Contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any Sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurements, Public Buildings Branch.

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(POST TYPE—DOUBLE COLUMN.)

6" Spindles N-B-P, floor plate 26"x10'. Also separate Milling Attachment, three motors of 220 V. D.C. Weight 40 Tons. Excellent condition—Immediate shipment.

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Pels No. 16-sp. Capacity 1 1/16"x¾", high gap with triple gag punch att., for MD.  
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6"x6"x¾" Kling Double Shaft, on turntable, MD.

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Air Compressor—Laidlaw-Dunn-Gordon 12"x14" M.D. Duplex Single Stage.  
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 Drill—Niles 6" Universal Radial.  
 Drill—Leland-Gifford 4 Spindle Power Feed.  
 Drill—P. & W. No. 11 Mult. Spindle.  
 Engraver—Keller No. E-2.  
 Gear Hobbers—Barber Colman No. 3, No. 12.  
 Gear Shapers—Fellows No. 7—Hl Speed.  
 Grinders—Brown & Sharpe No. 10, No. 11 Plain.  
 Grinder—Heald No. 70 Internal.  
 Grinder—Queen City 16"x72" Pl. Cyl.  
 Grinder—Pratt & Whitney 14" B.B. Vert. Sur.  
 Grinder—Badger No. 221 Disc.  
 Lathe—Whitcomb-Blaisdell 20"x24", C.C.G.  
 Lathe—J. & L. "Hartness" 3"x36" Steel Head.  
 Millers—(2) Milwaukee No. 2B Double Overarm Plain.  
 Miller—Potter & Johnston No. 2M.  
 Miller—Milwaukee No. 1½B Double Overarm S.P.D. Univ. Miller.  
 Miller—Becker No. 6 Vertical.  
 Miller—Van Norman No. ½, No. 2 Duplex.  
 Millers—Cincinnati 18" Automatic.  
 Planer—Niles-Bement-Pond 42"x12"x18"—M.D. Four Head.  
 Press—Bliss No. 3½-A. D. A. Toggle.  
 Saw—Peerless 13"x13" Univ. Shaping.  
 Screw Machines—(3) Cone 1½".  
 Screw Machines—Davenport No. 2.  
 Screw Machines—New Britain No. 652.  
 Shapers—(2) Pratt & Whitney Vertical (1-6", 1-10").  
 Shear—Niagara No. 772.  
 Tester—Riehle 100,000 lb. M.D. Hardness.  
 Thread Roller—Waterbury-Farrel No. 4 Screw.

**BOTWINIK BROS., INC.**  
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 NEW HAVEN, CONNECTICUT

**MONARCH ENGINE LATHE**—Cone Drive 24" X 20" QUICK CHANGE, TAPER ATTACH.  
**GOULD & EBERHARDT CRANK SHAPER**—28" Cone Driven  
**BROWN & SHARPE GEAR CUTTER** No. 5—60"  
**BARBER COLMAN GEAR HOBBERS**—Nos. 3 and 12  
**WARNER & SWASEY TURRET LATHE** No. 4 Plain and Universal  
**DIAMOND SURFACE GRINDER** 16 X 50 Belt Driven  
**60" SUNDSTRAND DOUBLE END CENTERING MACHINE**—Motor Driven  
**INDIANAPOLIS MACHINERY & SUPPLY CO., INC.**  
 1959-69 South Meridian Street, Indianapolis, Indiana

No. 3A Universal 3" Horizontal Boring Mill.  
 4 sp. Leland-Gifford H.S. Drill, 12" overhang.  
 No. 3 taper, power feed on each spindle.  
 No. 14 Cochrane Bly Duplex Universal Vertical Mill and Shaper.  
 No. 2 Kempsmith Maximiller, S.P.D.  
 No. 2½B K. T. Vertical Miller, S.P.D.  
 No. 3 Oilgear Hydraulic Broaching Machine, type XA.  
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**66" x 30'** JOHNSON  
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 Heavy Duty  
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Weight 1000 lbs.  
 Stroke 1½"  
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 Bed FBxRL 8x15 in.  
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 Electric Spot, Butt and Seam Welders.  
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 Motor Driven—Complete with Cutters  
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**11' Stoll Motor Driven Power Shear**—capacity 14 Ga.

**24" x 12' Lodge & Shipley Crank—** Shaft Lathe.

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75 KVA Gibb Press Type Welder, Motor driven, Size 218, New 1930.

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H.P.	Speed	Volts	Make	Price
2-400 3 ph.	60 cy.	500	2200 Westinghouse	\$800
1-450 3 ph.	60 cy.	514	550 G.E. S.B.	950
5-15 D. C.	500/1000	550 G.E.	.....	290
2-20 D. C.	500/1000	550 G.E.	.....	340
1-Rock River Punch, 48"	Throat, Architectural Jaw.	Price	.....	850
1-15-Ton Morgan Crane, 68'	Span.....			
2-15-Ton Morgan Crane, 52'	Span.....			
1-5-Ton Universal Crane, 1/2 yard	Williams Bucket, Gas Driven Motor, mounted on White Truck			3,500
1-50-Ton Industrial Bay City Wreck Crane				4,500
1-20-Ton Browning Loco. Crane.....				4,000
1-25-Ton Industrial Bay City Loco. Crane				5,000
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1-80 HP. Scotch Marine return tubular Boiler, 125 lbs. capacity.  
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Anvils, Vices, Electric Hammers, Saw Filing and Jointing Machines, Electric Drills, Pumps, etc.  
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1-2200 Cu. Ft. Direct Motor Driven CHICAGO PNEUMATIC AIR COMPRESSOR, 100-lb. Pres. with a 400 HP G.E. Syn. Motor, 3/60/220 V. 200 RPM, fully complete and completely overhauled. Price \$5,000. Full details upon request.  
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Elec. Motors 3/60/440-20 HP, 40 HP  
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2-75 HP Elliott Co., 3 phase, 60 cycle, 220 or 440 volt-900 RPM. Ball Bearing.  
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Pumping plant consists of a single cylinder condensing Corliss Engine, cylinder 28" diameter, stroke 48", flywheel 16" diameter, steam pressure 160 lbs., barometric condenser, oil separator, extended shaft carrying gears that drive 8 single acting pumps in 2 groups of four each, plungers 6" diameter, 20" stroke, speed of engine 70 r.p.m., speed of pump shafts 35 r.p.m., capacity 685 gals. per minute (no slip or leakage), pressure 1000 lbs. per sq. inch. Accumulator is weighted for 1000 lbs. pressure per square inch, and has plunger 16" diameter with about 18" stroke, and automatic control operating in connection with pump.

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300 amp. Lincoln 220 volt D.C. drive

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H. P.	Make	Volts	Type	Speed
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2-600	G. E.	2300/550	MT-Slip Ring	257
1-600	G. E.	2300/440	MT-Slip Ring	705
1-450/360	West.	2200	CW-S. Ring	875/700
1-400	West.	2300	CW-Slip Ring	614
1-300	Al. Ch.	2200	ANY-Slip Ring	585
1-250	F. Mor.	2200	BV-Slip Ring	1200
2-200	West.	220/440	CW-Slip Ring	900
1-200	G. E.	220/440	I-M-Slip Ring	900
1-150	G. E.	440	I-E13AA-S. R.	1750
1-100	West.	440/220	CW	600
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Large Stock of FULLY GUARANTEED a.c. and d.c. MOTORS-GENERATORS-TRANSFORMERS and ELECTRICAL EQUIPMENT

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Just released the following 230 volt D.C. Cranes, in one plant. All good operating condition.

40, 20, and 10-ton Cranes, 4-motor, 75' 0" span.  
20, 10 ton P. & H. Cranes, 4 and 3-motor, 33' 6" span.  
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Late type Milwaukee cranes must be sold immediately.  
2-5-ton Milwaukee, 3-motor, 100' 0" span, 230 volts D.C. Price \$2750.00 each.  
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Send me your Crane and Hoist inquiries.  
JAMES P. ARMEL  
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2-25 HP 1800 RPM, Type KF Sleeve bearing motors, with base no pulley, 220/440 volt, 60 cycle 3 phase, used 10 hours ..... \$160.00 Each

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## FINE LOCOMOTIVE CRANE

American 8 wheel, 25 ton, 50' Boom, Twin Drums, 1702. Natl. Code Boiler, retubed. Lighting Set. Fully complete and strictly first class. Built 1929. Used very little. Available immediately for sale or rent.

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LOCOMOTIVE, 25 ton, Vulcan, std. gauge, saddle tank, rebuilt. Bargain.  
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Three, 10-yd., built 1927, steel, in unusually good condition  
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BUCYRUS 320-B, 2200/4000 volts, 3 ph., 60 cycle, A.C. 250 volt Ward-Leonard control. 90 ft. boom and 58 ft. dipper stick. Built in 1925 and used only two years, and in good condition. Located near Madisonville, Ky. Part cash; terms if necessary.

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Supply full particulars, including age and condition.

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## WANTED

## WANTED

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Guaranteed to be in first class condition.

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BRASS, BRONZE AND ALUMINUM CASTINGS

BRASS AND BRONZE CASTINGS  
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OUR SPECIALTIES

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with Boiler Shop, Foundry and Machine Shop suitable for heavy work, desires a working arrangement with a well-established American firm to manufacture their products in Canada.

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# ADVERTISERS INDEX

## A

Abbott Ball Co., The.....	143
Acme Steel Co.....	132
Albert & Davidson Pipe Corp.....	163
Albert Pipe Supply Co., Inc.....	163
Aluminum Co. of America.....	12-13
American Air Compressor Corp.....	162
American Chemical Paint Co.....	152
American Foundry Equipment Co.....	95
American Hollow Boring Co.....	145
American Hot Dip Galvanizers Association, Inc.....	129
Archer & Baldwin, Inc.....	162
Armstrong, James P.....	162
Armstrong-Blum Mfg. Co.....	90
Armstrong Bros. Tool Co.....	85
Athenia Steel Co., The.....	139
Atlas Car & Mfg. Co., The.....	88

## B

Baird Machine Co., The.....	130
Baldwin-Duckworth Chain Corp.....	92
Baldwin-Southwark Corp., Southwark Div.....	17
Barnes, Wallace, Co., The, Div. of Associated Spring Corp.....	24
Barnett, I. A., Co.....	164
Belmont Iron Works.....	149
Belyea Co., Inc.....	162
Bennett-Rafkin Mchry. Corp.....	160
Bethlehem Steel Co.....	3
Bixby, R. W., Inc.....	165
Bliss & Laughlin, Inc.....	75
Botwinik Bros., Inc.....	161
Brassett, H. A., & Co.....	149
Brooke, E. & G., Iron Co.....	153
Browning, Victor R., & Co., Inc.....	162
Buffalo Mchry., Co., Inc.....	160
Buffalo Wire Wks. Co., Inc.....	157
Bullard Co., The.....	58
Business Opportunities Section.....	164

## C

Cadman, A. W., Mfg. Co.....	164
Canton Fdry. & Mach. Co.....	147
Carbon Malleable Casting Co., Inc.....	146
Carborundum Co., The.....	6-7
Cattie, Joseph P., & Bros.....	164
Celcote Co., The.....	152
Chace, W. M., Co.....	89
Cincinnati Bickford Tool Co., The.....	72
Clark Bros. Bolt Co.....	90
Clearing House Section.....	158-163
Cleveland Cap Screw Co., The.....	135
Cleveland Crane & Engineering Co.....	83
Cleveland Steel Tool Co., The.....	142
Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.....	83
Cleveland Twist Drill Co., The.....	4
Cold Metal Process Co.....	73
Commonwealth Brass Corp.....	156
Conco Engineering Works.....	147
Cone Automatic Mach. Co., Inc.....	142
Continental Steel Corp.....	89
Contract Manufacturing Section.....	164
Crawford, F. H., & Co., Inc.....	161
Crosby Co., The.....	136
Crucible Steel Castings Co.....	145

## D

Darwin & Milner, Inc.....	144
Davenport Locomotive Works.....	148
Delta Equipment Co.....	161
Detroit Hoist & Machine Co.....	147
Detroit Rex Products Co.....	87
Donahue Steel Prods. Co.....	161
Dreis & Krump Mfg. Co.....	143
Dunbar Bros. Co., Div. of Associated Spring Corp.....	119

## E

Earle Gear & Mach. Co.....	148
Eastern Machine Screw Corp., The.....	142
Eastern Mchry. Co.....	158

Eastern Tool & Stpg. Co., Inc.....	164
Edge Hill Silica Rock Co.....	152
Electric Controller & Mfg. Co., The.....	86
Electric Hoist & Motor Co.....	162
Electro Metallurgical Co.....	11
Elmes, Chas. F., Engineering Wks.....	143
Elwell-Parker Electric Co., The.....	79
Emerman, Louis E., & Co.....	160
Employment Exchange Section.....	165
Erdle Perforating Co.....	151
Espen-Lucas Mach. Wks., The.....	142
Easley, E. L., Mchry. Co., The.....	161

## F

Falls Clutch & Mchry. Co., The.....	148
Farrel-Birmingham Co., Inc.....	76
Filinn & Dreffeln Co.....	149
Ford, J. B., Co., The.....	69
Forging & Casting Corp., The.....	16
Foster, Frank B.....	161
Foster, L. B., Co., Inc.....	163
Frank, M. K.....	163
Franklin Mfg. Co., The.....	164

## G

Galland-Henning Mfg. Co.....	119
Garlock Packing Co., The.....	74
Gisholt Machine Co.....	133
Goldman, Harvey, & Co.....	159
Goodman Electric Mchry. Co.....	162, 163
Goss & DeLeeuw Mch. Co.....	138
Great Lakes Steel Corp.....	8-9
Greenpoint Iron & Pipe Co., Inc.....	163
Griffin Mfg. Co., Inc.....	144

## H

Harrington & King Perforating Co., The.....	91
Hartford Drop Forge Co., The.....	164
Hassall, John, Inc.....	152
Hawkins & Co.....	163
Hayward Co., The.....	147
Heller Machine Co.....	70
Hendrick Mfg. Co.....	151, 157
Hill-Clarke Mchry. Co.....	158
Holcroft & Co.....	139
Hoskins Mfg. Co.....	2
Houde Engineering Corp.....	84
Hunter Steel Co.....	162
Hyde Park Fdry. & Mch. Co.....	153
Hyman, Joseph, & Sons.....	161
Hyman-Michaels Co.....	163

## I

Ideal Machinery Co.....	162
Indianapolis Mchry. & Supply Co., Inc.....	161
Industrial Equip. Corp., The.....	163
Industrial Mchry. & Motor Co.....	161
Industrial Machinery Corp.....	159
Industrial Steel Casting Co., The.....	145
Inland Steel Co.....	25
International Nickel Co., Inc., The.....	14
Iron & Steel Prods., Inc.....	163

## J

Jarecki Mfg. Co.....	156
Jeffrey Mfg. Co., The.....	123
Jones & Laughlin Steel Corp.....	15

## K

Knox, Earl E., Co.....	162
------------------------	-----

## L

Land, L. J.....	162
Landis Machine Co., Inc.....	142

Latrobe Electric Steel Co.....	144
Lee Spring Co., Inc.....	153
Leland-Gifford Co.....	142
Leschen, A., & Sons Rope Co.....	139
Logan Co., Inc.....	5
Lucas, J. L., & Son, Inc.....	160
Lucas Mch. Tool Co., The.....	138
Lunney, Frank J.....	161

## M

Maehler, Paul, Co., The.....	84
Malleable Iron Fittings Co.....	146
Malloy & Schreiner.....	163
Marr-Galbreath Machinery Co.....	160
Michigan Tool Co.....	60-61
Midland Steel & Equip. Co.....	161, 163
Miles Mchry. Co.....	160
Milne, A., & Co.....	85
Mississippi Valley Equip. Co.....	162
Morey Mchry. Co., Inc.....	158
Morgan Construction Co.....	134
Motor Repair & Mfg. Co.....	162
Moyer, J. N.....	161
Mundt, Chas., & Sons.....	150
Murray Iron Wks. Co.....	164
Myers, Wm. M.....	164

## N

National Bearing Metals Corp.....	146
National Business Bourse.....	165
National Machinery Exchange.....	161
National Metals Co.....	162
National Steel Corp.....	8-9
Nazel Engineering & Machine Works.....	153
New Departure Div. General Motors Corp.....	167
New Jersey Zinc Co., The.....	130
Nicholson File Co.....	131
Nilson, A. H., Mch. Co.....	150
North American Mfg. Co., The.....	71

## O

O'Brien Mchry. Co., The.....	159
Ohio Locomotive Crane Co., The.....	147
Oilgear Co., The.....	126
Olson Mfg. Co.....	164
Ottmiller, Wm. H., Co., Inc.....	152

## P

Parish Pressed Steel Co.....	121
Parker-Kalon Corp.....	152
Peoria Malleable Castings Co.....	146
Pittsburgh Lecomelt Furnace Corp.....	150
Pittsburgh Metallurgical Co., Inc.....	117
Platt Bros. & Co., The.....	157
Poor & Co., Canton Forge & Axle Works.....	145
Progressive Mfg. Co., The.....	138

## Q

Quigley Co., Inc.....	137
-----------------------	-----

## R

R. & S. Machinery Co.....	161
Reliance Mchry. Sales Co.....	161
Republic Steel Corp.....	1
Revere Copper & Brass, Inc.....	162
Rhoades, R. W., Metaline Co., Inc.....	143
Richardson Co., The.....	68
Ridgway, Craig, & Son Co.....	147
Ritterbush & Co., Inc.....	159
Robbins & Myers, Inc.....	147
Rockford Drop Forge Co.....	145
Rosenkranz, Weisbecker & Co., Inc.....	159, 161
Ryerson, Jos. T., & Son, Inc.....	28

## S

S K F Industres, Inc.....	26
Sansom, W. J., Co.....	164
Schatz Mfg. Co., The.....	21
Screw Machine Products Corp.....	152

Seneca Wire & Mfg. Co., The.....	157
Severin Machinery Co.....	162
Shafer Bearing Corp.....	141
Shore Instrument & Mfg. Co.....	157
Simmons Mch. Tool Corp.....	159
Simonds Mfg. Co., The.....	148
Sleeper & Hartley, Inc.....	149
Standard Pressed Steel Co.....	152
Stanhope, R. C., Inc.....	162
Stanley Works, The.....	144
Steiner, George.....	163
Stevens Hotel.....	138
Strand, N. A., & Co.....	142
Sun Mchry. Co.....	160, 161
Sun Oil.....	67
Superior Bronze Corp.....	164
Superior Charcoal Iron Co.....	139
Superior Electric Mchry. Co.....	162

## T

Taft-Peirce Mfg. Co., The.....	120
Texas Company, The.....	10
Thomson-Gibb Elec. Welding Co.....	66
Timken Steel & Tube Div., The Timken Roller Bearing Co.....	168
Tomkins-Johnson Co., The.....	91
Torrington Co., The.....	149
Towmotor, Inc.....	77
Treasury Dept.....	160, 164
Tri-State Pipe Co.....	163

## U

Union Carbide & Carbon Corp.....	11
U. S. Steel Wire Spring Co.....	153

## V

V & O Press Co., The.....	144
Valley Mould & Iron Corp.....	65
Vanadium Corp. of America.....	18
Victor Mchry. Co.....	161
Victor Machinery Exchange.....	159
Vonnegut Moulder Corp.....	82

## W

Waldron, John, Corp.....	150
Walker, Walter, Mchry.....	160
Walsh, J. T.....	162
Wanted Section.....	163
Warner & Swasey Co.....	80-81
Waterbury Farrel Foundry & Machine Co., The.....	23
Webb Wire Wks., The.....	157
Western Wire Products Co.....	157
Westinghouse Air Brake Co., Industrial Div.....	20
Wetherell Bros. Co.....	144
Whiting Corp.....	147
Wickwire Spencer Steel Co.....	19
Wigglesworth Mchry. Co.....	161
Williams Inn.....	138
Williams, J. H., & Co.....	145
Winterer, Herman L.....	163
Worcester Stamped Metal Co.....	146
Worthington Pump & Machinery Corp.....	125
Wylie-Stewart Mchry. Co.....	162

## Z

Zoll, Edwin H., Inc.....	164
--------------------------	-----

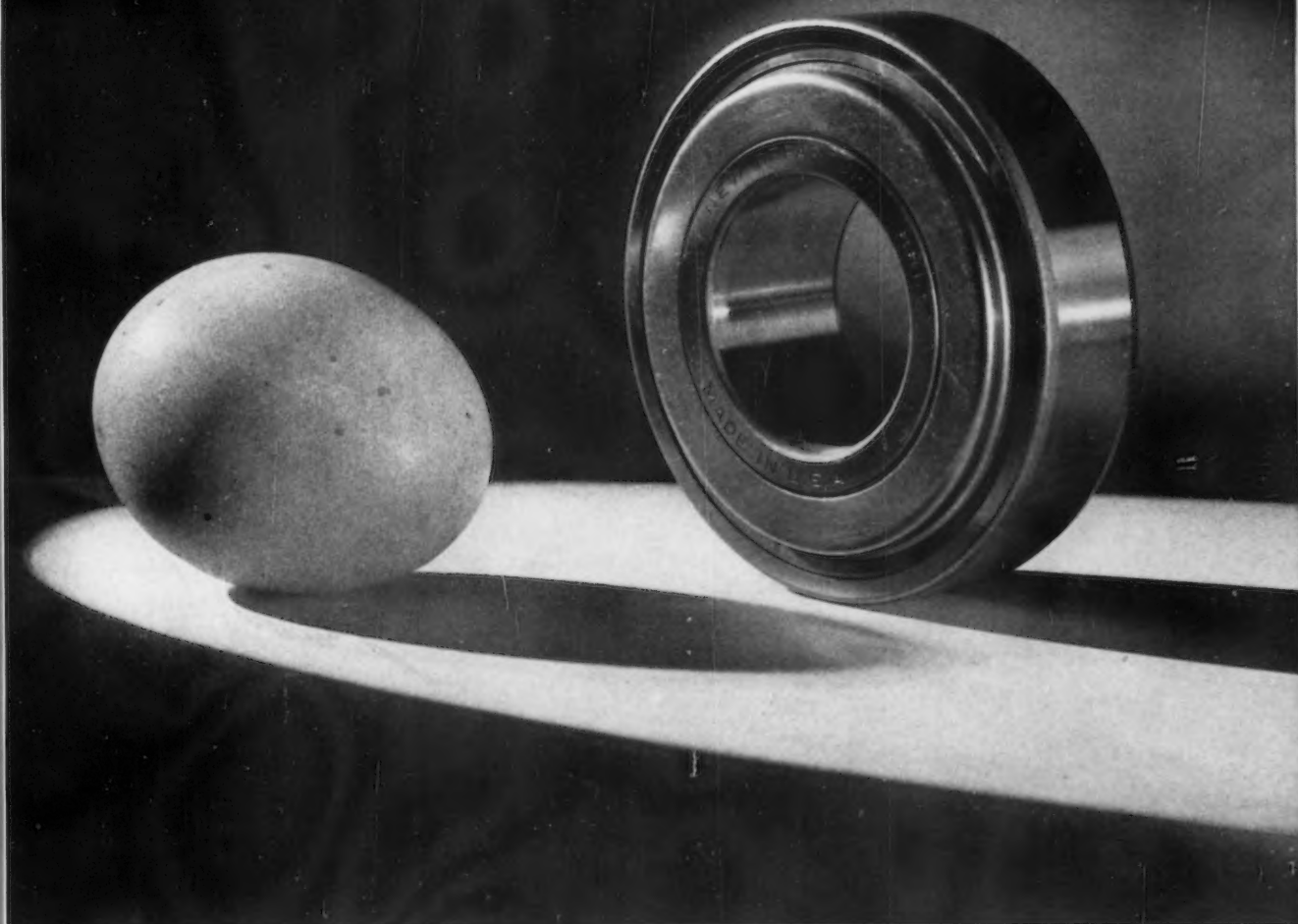
## CLASSIFIED SECTION

Business Opportunities.....	164
Clearing House.....	158-163
Contract Manufacturing.....	164
Employment Exchange.....	165
Wanted.....	163

New Industrial Literature.....	127
--------------------------------	-----

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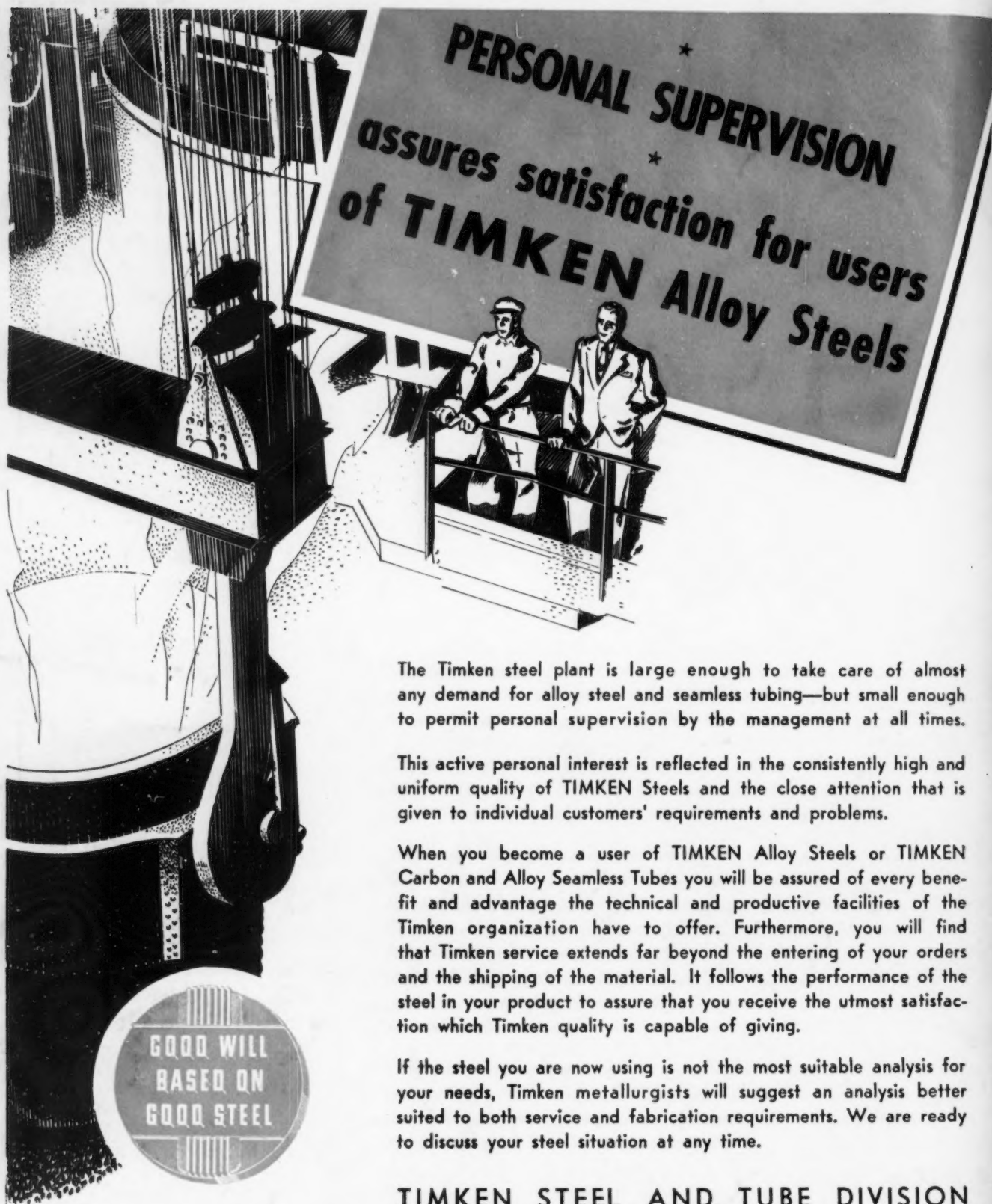
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